South East Europe Regional Infrastructure Program

C-15: Drnis, Croatia Water Utilities Financial Statements and Projections, and PSP Options Analysis

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Booz | Allen | Hamilton

Abbreviations and Acronyms

BAH	Booz Allen Hamilton
BOO	Build-Own-Operate
BOT	Build-Operate-Transfer
€	Euro
EBRD	European Bank For Reconstruction and Development
EU	European Union
FDI	Foreign Direct Investment
FY	Fiscal Year
HBOR	Hrvatska Banka za Obnovu I Razvitak
HRK	Croatian Kuna (Currency)
HV	Hrvatska Voda
GFS	Government Financial Standards
GOC	Government of Croatia
IAS	International Accounting Standards
IMF	International Monetary Fund
IP3	Institute for Public-Private Partnerships, Inc.
IPH	Institute for Public Health
IPO	Initial Public Offering
Km	Kilometers
ℓ	Liter
LGU	Local Government Unit
m	Meter
mg	Milligrams
MEPPP	Ministry of Environmental Protection and Physical Planning
MOF	Ministry of Finance
MTEF	Medium Term Economic Framework
NA	Not Applicable
NATO	North Atlantic Treaty Organization
NGOs	Non Government Organizations
O&M	Operations and Maintenance
OECD	Organization for Economic Co-operation and Development
PPP	Public-Private Partnership
PSP	Private Sector Participation
RIP	Regional Improvement Program
s	Second
SAA	Stabilization and Association Agreement
SOW	Scope of Work

TOR	Terms of Reference
UFW	Unaccounted-for Water
USD	United States Dollar
USAID	United States Agency for International Development
WB	World Bank
WTO	World Trade Organization
VAT	Value Added Tax
ZOV	Zagrebacke Otpadne Vode

Currency Conversion

1 HRK =	0.16349 US$
1 € =	1.19 US$

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Executive Summary

Under the United States Agency for International Development's Regional Infrastructure Program (RIP), Booz Allen Hamilton (BAH) was asked to develop a business plan for the RAD Drniš water utility in Croatia and evaluate the options for private sector participation (PSP) in the provision of water services in Drniš. The scope of this work entails providing basic financial analysis of the existing utility in order to assess the financial viability of its water operations and the adequacy of its tariff structure in order to develop a five-year business plan, and analyzing the options for PSP. This work was carried out with a multidisciplinary team composed of foreign and local experts. This report has to three (3) primary objectives: i.) To review the basic financial and institutional status of the water utility; ii.) To develop a medium-term financial forecast generating conclusions in terms of water sector financial solvency, ability to finance investment and requirements to adjust tariffs over the next five-years for the water utility; and iii) To evaluate the options for PSP in the provision of water services and recommend the preferred option(s).

Findings and conclusions include:

- RAD is a small operation serving a population of approximately 10,000 persons with about 5,000 total connections (4,700 household connections and 200 business connections). Local consumption of water has increased by less than 1% per annum on average since the end of the war in 1995.
- RAD has a higher work force to customer ratio compared to the average European, Latin American, Russian or American water utility. This ratio indicates that RAD may be overstaffed relative to the general size of its operational base.
- Most current maintenance and repair efforts are geared towards reducing water losses when lines break (or pollution when a sewerage line breaks). Despite RAD's proactive water loss maintenance program, company officials estimated that technical system losses are about 67%.
- While the staff of RAD carry out day-to-day activities related to the provision of water and the collection and disposal of wastewater, the utility relies almost entirely on the Šibenik water utility (a larger utility serving as a regional hub within the county) for investment planning and the execution of capital works.
- Discussions with RAD officials indicate that they have attempted to increase tariffs several times over the past two years but were met with substantial local community opposition. The structure of RAD's water tariff currently does not have automatic inflation adjustment

mechanisms (escalators) to accommodate increases in the cost of production inputs due to inflation.

- Aggressive water loss reductions combined with household and business tariff increases should improve RAD's general financial performance. Modest increases in tariffs combined with aggressive water loss reduction measures are meaningless if the level of cash collections do not improve from their current (RAD) estimate of 70%, to a more acceptable 95% to 98%level.
- RAD should initiate a dialogue with the Šibenik utility regarding the possibility of arranging a performance-based management contract for water services at the county level. Such an arrangement would enable RAD to benefit from the technical and managerial expertise of a private operator without requiring it to shoulder the entire cost of the arrangement.
- A BOT arrangement may provide the appropriate solution for the development of a greenfield wastewater treatment facility. It will only be viable, however, if undertaken at the regional level. Such an arrangement would have to be championed by a larger service provider such as the utility in Šibenik.

I. Introduction

Under the United States Agency for International Development's (USAID) Balkans Regional Infrastructure Program (RIP), Booz Allen Hamilton (BAH) was asked to develop a business plan and evaluate the options for Private Sector Participation (PSP) for the RAD Drniš water utility in Croatia. The RIP project aims to develop, through the implementation of basic water leakage detection work, future investment requirements and associated business plans for municipal water utilities whose distribution networks have been damaged during the war and whose customer base have shrunk due to population displacement.

The scope of this work entails providing basic financial analysis of the existing utility in order to assess the financial viability of its water operation and the adequacy of its tariff structure in order to develop a five-year business plan. This is complimented by an analysis of the means and ways for the utility in Drniš to lower its operating costs as well as finance its investment needs through PSP. This work was undertaken with a multidisciplinary team composed of foreign and local experts.

This report has three (3) primary objectives: i.) To review the basic financial and institutional status of the water utility; ii.) To develop a medium-term financial forecast generating conclusions in terms of water sector financial solvency, ability to finance investment and requirements to adjust tariffs over the next five-years for the water utility; and, iii) To evaluate the options for PSP in the provision of water services and recommend the preferred option(s).

Excluding this brief introductory section, this report is divided into nine (9) sections. The second section provides a brief overview of underlying political, economic, and legal climate in Croatia, as well as the experience to date with PSP. The third section is an overview of the water sector in Croatia, including descriptions of the roles and responsibilities of key institutions as well as the regulatory framework at the national and local levels. Section four provides an analysis of the water sector in Drniš, including the utility's recent economic performance and operating environment. The fifth and sixth sections provide an analysis of RAD's financial performance as well as future financial projections. The seventh and eighth sections contain a description of the options for PSP and an outline of the recommended option(s) for Drniš. Finally, the last section details the recommended next steps based on the financial analysis and PSP options evaluation.

II. Overview

II.1 Croatia Economy and Political Climate

When it assumed office in early 2000, the administration of President Stipe Mesic took a number of steps to liberalize trade and prices, integrate Croatia's economy with the international markets, liberalize the infrastructure sector, and address corruption and cronyism in the public sector. In its bid to internationalize Croatia's economy, the country has become a member of the World Trade Organization (WTO), submitted its application for membership in the European Union (EU)[1], and joined NATO's Partners for Peace Program. A key part of the economic reform process has been the introduction of PSP, and the government has been highly successful in privatizing the financial services and telecommunications sectors.

The result of these reforms has been an improving economic climate. In 2000, the economy emerged from years of war and post-war contraction and grew by 2.9%, a figure that increased to 3.8% in 2001. At the same time, inflation declined from 6.2% in 2000 to 4.9% in 2001.[2] Despite the gains realized from economic growth and reduced inflation, the economy still suffers from the country's high fiscal deficit, which represents 7% of GDP.

After its initial success, the process of reform in Croatia slowed in 2002 when members of the ruling coalition began to disagree on key policy decisions. As a result, President Mesic stepped down in July 2002 and Prime Minister Ivica Racan assumed the country leadership. The Racan administration took office with a mandate to reduce the size of the public sector, while at the same time reducing unemployment and forging ahead in the reform process as a lead-in to parliamentary elections in late 2003.

Unemployment, currently estimated at 15.8%, is a major problem in Croatia today. As a result, the public sector is unduly large and employment protections are stringent. It is unlawful for employees to be dismissed due to their age or health, and in cases of lawful dismissal, the length of notice period and severance requirements are substantially higher than the EU average.[3] Sixty four percent of laborers in Croatia are unionized, and the unions are independent of both government and political parties.

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[1] *This follows Croatia's earlier signature of a Stabilization and Association Agreement (SAA) with the EU.*

[2] *"Strategy for Croatia," European Bank for Reconstruction and Development. 19 November 2002, p. 4.*

[3] *Employees who have worked for an employer for 20 years or more must be given up to 6 months notice and severance pay equating to 10 months salary (EU average is 4.9 months and 3.7 months respectively). "Strategy for Croatia," European Bank for Reconstruction and Development. 19 November 2002, p. 13.*

II.2 Croatia Legal Environment

Croatia's legal environment is typical of a country making the transition from a state-controlled to a market economy. While certain commercial laws – such as those governing bankruptcy – are advanced by regional standards, in other areas the legal framework is lacking. As a result, the pace of foreign direct investment in Croatia has been slow.

The Government of Croatia (GOC) has taken a number of steps to reform the legal environment, including:

- Passing a new law allowing international arbitration;
- Acceding to international anti-corruption instruments and mechanisms, including the Council of Europe Convention on laundering, search, seizure, and confiscation of the proceeds of crime, the Criminal Law Convention on corruption, and the UN Convention against Transnational Organized Crime;
- Establishing an Office for the Fight Against Corruption and Organized Crime;
- Introducing a new public procurement law in line with EU standards.

While the ongoing legal reforms have strengthened the structure of Croatia's legal system, the judicial system is still weak and confidence in the courts is lacking. To address this problem, the government has made reform of the courts system one of its top priorities and appointed a new Minister of Justice in 2001 and a new Chief State Prosecutor in 2002.

II.3 Experience with PSP

Croatia's experience with PSP is relatively recent. Privatization revenues, however, have been an important source of financing for the government.[4] Under the guidance of the Croatian Privatization Fund, between 2000 and 2002 the GOC divested its holdings in the financial services and telecommunications sectors as well as in a number of small and medium enterprises it had taken over during the war.[5]

In the roads sector, a concession has been awarded for the construction of an Istrian highway to Bina-Istra, a consortium 51% owned by Bouygues of France and 49% by the GOC, and negotiations are ongoing for the award of a concession to upgrade the highway between Zabok and Macelj.

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[4] *In 2001, over 50% of the government's financing requirements were met through the proceeds from privatization.*

[5] *In many cases, a majority share in existing banks – such as PBZ and Slavonska Banka – was sold.*

New energy laws provide for the introduction of PSP in the gas, oil, and electric power sectors. Under these laws, the GOC has made progress in the partial privatization (through a sale of 25% plus one share) of INA, the gas distribution monopoly. And soon HEP – the Croatian electric power company – will be divided into generation, transmission and distribution units under the control of an asset holding company, of which a 15% ownership share will be sold through an initial public offering (IPO). Similar legislation is being developed to support the unbundling and eventual introduction of PSP in the railways sector.

In the water sector, the recent BOT for the first-ever wastewater treatment in Zagreb is the highest profile example of PSP. It is also the first-ever BOT (in any sector) undertaken in Croatia. Currently, wastewater from Zagreb is discharged directly into the Sava River, causing serious pollution. An European Bank for Reconstruction and Development (EBRD) loan of EURO 55 million (USD 65 million) will help the city tackle this problem and comply with European Union (EU) environmental standards. The EBRD's loan is being provided to Zagrebacke Otpadne Vode (ZOV), a private company chosen through an international tender to build, operate and maintain the treatment plant. In addition to building the plant, ZOV will also construct supporting infrastructure. The city will control the private company through a long-term concession contract, which sets out the discharge standards that the wastewater must meet.

III. The Water Sector in Croatia

The legal authority for the provision of water and wastewater services in Croatia has been decentralized to the municipal level. While this has resulted in more demand-responsive and locally appropriate approaches to service provision, it has hindered the development of regional solutions to such problems as wastewater treatment, water resources management, and environmental protection. In addition, many of the municipalities in Croatia lack the capacity to finance needed investments or undertake comprehensive long-range planning in the water and wastewater sector.

Although the decentralized framework transfers the responsibility for service provision to the local level, municipalities still in many respects lack the autonomy to fulfill their obligations. For example, once a municipality determines its investment requirements and develops a plan for new capital works, it must apply to the Ministry of Environmental Protection and Physical Planning (MEPPP) for a location permit before it can break ground. In order to receive a location permit, it must first carry out an environmental impact assessment that must be reviewed and approved by the Ministry. These national-level approvals and the process required to obtain them are the most time-consuming aspect of the capital planning process.

III.1 Hrvatska Voda

Hrvatska Voda (HV), or "Croatia Waters," is the national government entity responsible for planning and policy setting in the area of water and wastewater treatment. According to its website, HV's full range of responsibilities include:

- General water management;
- Studies, data, and project assignments and revisions;
- Investing and other financial issues;
- Coordination of plans for water use;
- Setup and maintenance of integrated data systems for water management;
- Control, survey, and informing on water conditions;
- Maintenance and regulation of watercourses;
- Ice and flood control;
- Construction and maintenance works in water management;
- Designing water control systems and other systems in water-related activities;
- Protection of water resources;
- Development and monitoring of water supply;
- Usage control and other protective measures; and

- Enforcement of legal sanctions in water conservation.

Recently, the GOC has undertaken some preliminary initiatives to rationalize the institutional structure of HV. The new role envisioned for HV is premised on the corporatization of water supply services at the municipal level, the regionalization of wastewater management, and the introduction of PSP in the financing and management of wastewater treatment facilities.

In its new role, HV effectively has regulatory authority over most water activities, including water abstraction, construction of domestic water supply and wastewater systems, pollution discharges, sand and gravel excavation, fish culture, and hydropower development.

HV also has a key role to play in assisting in the financing of new capital investment in water and wastewater infrastructure. Funding for such investment comes from:

- HV's role as on-lender of funds from HBOR (see below);
- Water abstraction fees;
- Pollution charges; and
- The central budget.

While most of the funds collected from the national government through the central budget and from municipalities (through pollution charges and abstraction fees) go towards capital investments, a portion of those funds is retained by HV to cover its administrative costs.

In principle, HV provides funding to municipalities for capital investment in the form of loans. However in practice, funding tends to take the form of a debt-equity swap with the municipal utilities. There are some legal limits on this - by law, HV may assume no more than a 49% share in the ownership of any municipal utility company. In most cases, this debt-equity arrangement has not been formalized and HV has not been legally assigned ownership. As a result, the ownership structure of many utilities in Croatia is indeterminate.

III.2 Hrvatska Banka za Obnovu I Razvitak

Hrvatska Banka za Obnovu I Razvitak (HBOR) or, the "Croatian Bank for Reconstruction and Development," is the entity responsible for providing financing for investment in Croatia's water and wastewater sector. HBOR was established in 1992 under a Special Law in order to channel funds for emergency and other reconstruction investments needed during the war. After the war, HBOR's primary role shifted to providing funding for development activities of regional or national importance in Croatia. In this

capacity, it provides medium- to long-term financing for projects, such as infrastructure investments, with long payback periods.

Whereas HV is the lead technical agency responsible for ensuring the feasibility of projects and undertaking detailed design work, HBOR is the sole provider of credit to Croatia's municipalities and as such is responsible for assessing their creditworthiness and capacity for borrowing to support investments in infrastructure.

HBOR finances municipal investments in three ways:

- Through direct lending to municipalities;
- As a second tier bank through local commercial banks; and
- Through HV (this represents bar far the largest element in HBOR's lending portfolio).

III.3 Regulation of the Water Sector

III.3.1 The National Level

Unlike the newly-formed regulatory agencies in the telecommunications and energy sectors, there is no independent regulatory agency governing the water and wastewater sector in Croatia. Rather, regulatory responsibility is split between various agencies and ministries at the national level, as well as regional and local government entities.

The Water Act of 1995 provides the legal foundation for the regulation of water resources in Croatia and gives responsibility for the country's water management regime to the State Water Directorate. Management of water resources is administered within catchment areas through collaboration between HV and local bodies.

The Ministry of Environmental Protection and Physical Planning (MEPPP), established in 2000, is responsible for setting and enforcing regulations relating to sustainable development throughout Croatia. This includes the protection of air, water, soil, sea, flora, and fauna. Surface waters (rivers, lakes, and artificial lakes), groundwater, and the coastal zone waters are classified in one of four categories in accordance with their utilization and quality. New environmental standards detailing the maximum allowable concentrations are in preparation. Until they are adopted, however, no standards or guidelines exist at the national level.

Drinking water quality monitoring is the responsibility of Croatia's Institute for Public Health (IPH), and monitoring is undertaken on a weekly basis. Any utility that sells more than 100 ℓ/second of water is required by Croatian law to maintain its own, in-house laboratory for water quality

monitoring and testing, and must report the results of these tests to IPH. Utilities whose water sales are below this threshold may either send their samples to a commercial laboratory to be tested for a fee or send them to a regional bureau of IPH for testing at no cost. In addition to the regular, weekly samples, provided by utilities, IPH also conducts random sampling of each water system. Although there are wastewater quality standards in existence in Croatia, these are not currently being enforced.

As the GOC takes steps to strengthen the legal and regulatory framework for the water sector within Croatia, it is also looking outwards at transboundary water issues. To this end, the Government has ratified:

- The Convention on the Protection of Transboundary Waters and International Lakes (Helsinki, 1992)
- The Convention on Water Management Cooperation for the Protection of the River Danube (Sofia, 1994)
- The Convention for the Prevention of the Mediterranean Sea Against Pollution
- The Protocol for the Prevention of the Mediterranean Sea Against Pollution from Land-Based Sources (with Annexes I, II, and III)

In addition, the Government has entered into cooperation vis-à-vis water management issues with the Governments of Hungary, Bosnia and Herzegovina, and Slovenia.

III.3.2 The Local Level

According to the Municipal Services Act (NN 36/95), which defines municipal services (including water supply and wastewater treatment and disposal), municipal services may be performed by:

1. A company founded by one or more local government units;
2. A public institution founded by a local government unit;
3. A service plant, established by one or several local government units; and,
4. A legal entity or person, subject to concession agreement.[6]

At present, 130 Croatian service providers (mainly located in larger urban areas) provide water supply and limited wastewater treatment services. Local government units founded many of these companies, with

[6] *See "Water Pricing in Croatia, Current Policies and Trends," The Regional Center for Central and Eastern Europe: Croatia-Country Description. Edited by Marina Markovic. Page 12.*

more than 99% of these limited liability companies majority owned by local municipal governments.

Funding for the activities of municipal service companies is provided from various sources. However, in the case of water supply and wastewater disposal and treatment, the funds are generally provided from fees charged for the service. The service provider determines the price and the method of payment for the provision of the service. In general, there are no administrative or legal limitations on the tariff. The tariff is for all practical purposes controlled by the company's founder (i.e.; the local government).

The basic economic regulations influencing the local price of water (and, the corresponding legislation) is presented in Table 1 below.

Table 1: Tariff Category and Corresponding Legislation

Tariff Category	Paid By	Legislation
▸ Price of Municipal Service	▸ Paid by end users	▸ The source of revenue for municipal services is defined by the Municipal Services Act (includes the service, repayment of loans for construction of facilities and municipal infrastructure). The price is determined by the provider of the municipal service with the consent of the owners of the company.
▸ Water User Fee	▸ Paid by legal entities and persons that abstract or pump water from water courses, lakes, storage reservoirs, ground aquifers, and other natural resources.	▸ The source of revenue for financing water management is defined by the Water Management Financing Act (NN 107/95). The fee is determined by the GOC.
▸ Water Protection Fee	▸ Paid by legal entities and persons that discharge wastewater or other substances that pollute water.	▸ The source of the revenue for financing of water management is defined by the Water Management Financing Act (NN 107/95). The fee charged is determined by the GOC.
▸ Concessions on Water and Water Estate	▸ Paid by concession holder for: ▸ Water abstraction for public water supply; use of water power for electricity generation; water abstraction for technological purposes in industrial and similar activities; pumping of mineral and thermal waters – water abstraction for irrigation; and, fish farming in enclosed bodies of water.	▸ Concession provides the right of use of water and water-related estate (i.e.; the right to perform economic and other activities on water and water related estate).

Source: "Water Pricing in Croatia, Current Policies and Trends," The Regional Center for Central and Eastern Europe: Croatia-Country Description. Edited by Marina Markovic. Page 14. Booz Allen Hamilton, 2003

IV. Water Services in Drniš

RAD d.o.o. Drniš ("Drniš Water Utility" or "RAD") is the public utility responsible for the provision of water and sewerage services in the municipality of Drniš and the surrounding small municipalities of Ruzič and Promina. The region in which Drniš is located was devastated during the Yugoslav war. Serb forces through 1995 occupied the territory and, as a result, the local government only resumed operations following occupation. Shortly after this, in 1996, the utility services resumed.

IV.1 Institutional Review

RAD is legally established under the companies' law and is wholly municipally owned, with initial capital stock of 17.8 million HRK (approximately USD 2.5 million)[7]. The municipality of Drniš owns 72% of the public utility with the remaining capital shares owned by the neighboring municipalities of Ruzič (16%) and Promina (12%).

RAD is a small operation serving a population of approximately 10,000 persons with about 5,000 total connections (4,700 household connections and 200 business connections). Local consumption of water has increased by less than 1% per annum on average since the end of the war in 1995. RAD claims to have sufficient capacity to sustain operations at this rate. It is currently seeking investment money to reduce leakages, purchase leakage detection equipment, and to build a sewerage treatment facility.

IV.1.1 RAD Corporate Charter

A review of the RAD articles of incorporation provide the following main activities for the utility:

- To supply the general population, enterprises, and other organizations of Drniš and the local community with drinking water;
- To treat wastewater received in its networks; and,
- To maintain and repair the municipal property used by the utility in its water and wastewater activities.

[7] *The U.S. dollar Croatian HRK exchange rate used throughout this document is USD 1 to 7 HRK.*

The corporate charter requires the utility to be financially self-sufficient and operate through revenue collected from its user charges. To achieve these goals, the utility is allowed to:

- Purchase property and non-property rights and alienate (sell or lease); property with the approval of its Directors (Founders);[8]
- The right to receive credits;
- The right to independently approve staff, and establish the form and size of employee wages as well as other income; and,
- The right to independently determine the allocation of its net profit.

IV.1.2 Organizational Structure and Management

RAD is governed by a Steering Committee rather than a Board of Directors. The Steering Committee is comprised of representatives of the municipalities of Drniš, Promina, and Ruzič, the three shareholders in the company. The Steering Committee's primary responsibilities are to:

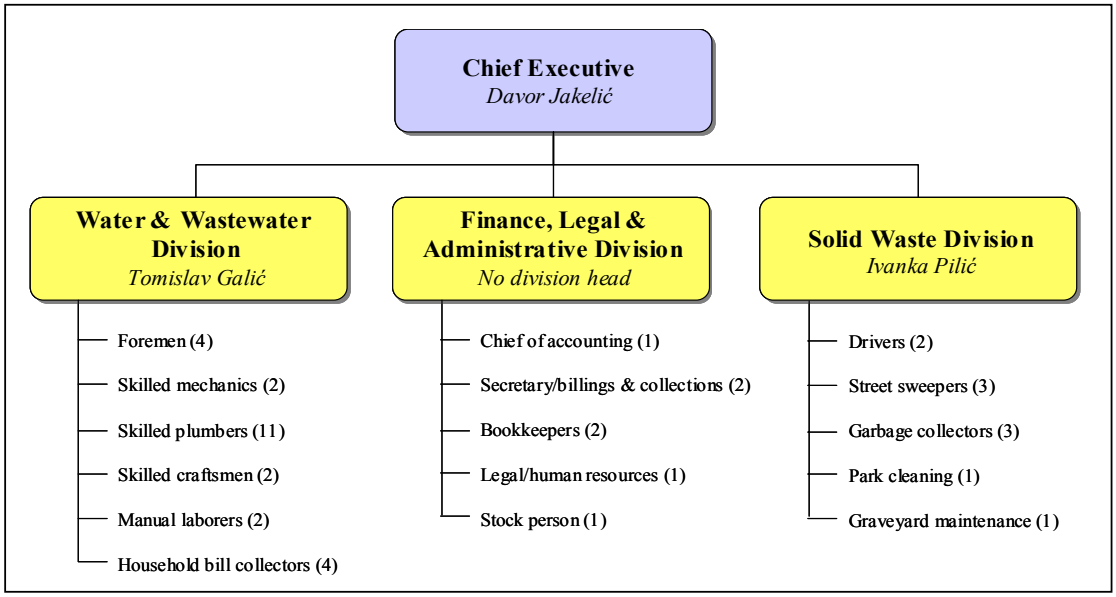
- Review the company's balance sheet on an annual basis;
- Present any requests for tariff increases to the municipalities; and
- Consult with the RAD Chief Executive on an as-needed basis.

RAD has 44 full time employees[9], with 26 of these dedicated to water and wastewater services, 10 dedicated to solid waste services, and 7 employees in financial, legal, or administrative functions that are shared by both the water/wastewater and solid waste divisions. The organization chart in Figure 1 below provides a detailed breakdown of the company structure.

[8] *The three founding communities Grad Drnis (72%), Ruzic (16%) and Promina (12%) are represented on the Board of Directors. The Board of Directors must approve the purchase and/or sale of property and non-property rights.*

[9] *The company only pays 50% of one employee's salary, with the other 50% paid through a welfare program.*

Figure 1: RAD d.o.o. Organization Chart



Booz Allen Hamilton, 2003

There are no part time employees at RAD, and all employees are unionized.[10] Some functions at RAD – such as software installation and maintenance and the maintenance of chlorination equipment - are outsourced. Other service contracts are let on an as-needed basis.

Although RAD is a corporatized entity, it is still subject to typical government human resources policies that limit its ability to hire and fire. This is particularly so given the high levels of unemployment in the Drniš area. The RAD Chief Executive estimates that the company is overstaffed by at least five employees, but he lacks the authority to rationalize the staff.

When the current Chief Executive assumed that position in 2000, the utility was operating at a large loss and was not paying any of its taxes. To address the situation, he initiated an across-the-board salary reduction upon taking office. Since that time, any savings that the utility has realized (these have primarily been due to leakage reduction and the resulting reduction in electricity costs) have been redirected towards salary increases, with the goal of bringing salaries back at least to the levels they were at when the reduction took place in 2000. At the time of this study, this goal was close to being met.

The Chief Executive is responsible for determining the structure, selecting, hiring and firing of personnel, and concluding employment contracts. The Head of the Water and Wastewater Division is the Chief Engineer (Technical Director). He effectively occupies the number two

[10] *There is only one union currently represented at the company. Relations with the union are governed through a collective bargaining agreement.*

positions in the utility hierarchy. The Chief Engineer and the Chief Executive work closely together and oversee all aspects of the utility operation.

Table 2, below, is an indicator of water utility operational efficiency. In brief, operational efficiency refers to the lowest cost use of labor, energy, water and materials in the day-to-day operation of a utility. Ratios between inputs and outputs provide an indication of operational efficiency. Two such ratios are staff per '000 connections, and staff per '000 persons served. A high number for either measure may indicate inefficient use of staff.

Table 2 shows that RAD's Water and Wastewater Division currently serves about 325 general population customers per employee.[11] As a result, RAD has a higher work force to customer ratio compared to the average European, Latin American, Russian or American water utility. This ratio indicates clearly that RAD is overstaffed relative to the general size of its customer base.

Table 2: Total Number of Employees Per Persons Served

Entity	Number of Employees per Person Served
RAD Drniš	1 per 325 persons
Average Russian Water Utility	1 per 380 persons
Average European Water Utility[12]	1 per 2,000 persons
Average Latin American Water Utility	1 per 1,500 persons

Source: World Bank, 2000
Booz Allen Hamilton, 2003

IV.1.3 Administration

RAD's accounting department follows the Croatian Federal Government regulations on accounting and guidelines issued by the Ministry of Finance. In accordance with current Croatia legislation, the accounting department produces collected revenue adjusted quarterly and annual balance statements (i.e., the expenses which they report for tax purposes are adjusted to reflect income received). The utility has not been audited for several years and it does not undertake any cost accounting analysis and broad work allocation (i.e., attributing to the appropriate cost centers their respective expenses), nor does it prepare an annual budget.[13]

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[11] *According to the IMGD engineering study dated April 7, 2003, RAD serves a population of more than 10,000 inhabitants.*

[12] *The average European and Latin American Water Utility numbers includes medium and large water utilities such as Sao Paulo, Brazil and Frankfurt, German.*

[13] *The managing Director and the Head of the Accountancy expressed an interest in doing this cost accounting exercise to distribute costs between their water/sewerage group and the utilities other*

IV.1.4 Urban Planning

Although RAD does maintain an asset register, it is by the company's own admission incomplete, and the RAD Chief Executive estimates that only 10% of the system is actually mapped.

We were unable to coordinate schedules with local municipal authorities (the municipal owners of the water utility). However, discussions with RAD indicate that the local municipal government of Drniš, through the Department for Planning, Housing, and Commercial Activities, does undertake small capital investments and takes minor credits for various infrastructure projects. However, according to the staff of RAD, this Department does not have any qualified engineers on staff that can undertake facility design or engineering. As a result, the municipality apparently does not have a long-term urban plan or a multi-year capital investment plan, and capital investment planning is undertaken on a year-to-year basis.

Discussions with representatives of the Urban Institute (Croatia) indicate that substantial work with small local municipal governments must be undertaken to strengthen their capacity to undertake necessary investment requirements. Under the current law, municipalities derive a substantial portion of their revenues from taxes shared with the central government (i.e.; 45% of income taxes, 10% of corporate taxes, and 60% of property taxes) and from local taxes (i.e.; parking fees, income tax surcharges etc.,). The central government provides transfers for certain purposes. As a result, the borrowing capacity of most small local municipalities like Drniš is limited. Annual municipal debt service, according to Croatian Law, cannot exceed 20% of budget revenues. However, very few Croatian municipalities have been in a position to borrow for long-term infrastructure investments. According to EBRD estimates, there is a significant discrepancy in the level of capital/investment spending undertaken by the 20 Croatian counties in 1999.[14] War affected counties (and, local municipalities) such as Vukovar-Sirmium and Sibenik-Knin spent less than one HRK per capita on environmental infrastructure compared with 37 HRK per capita for the entire country.

The increase in the number of small municipalities poses a key challenge with respect to the abilities of the fragmented municipalities to undertake necessary investments in water and wastewater treatment, solid waste, and urban transport. In the case of Drniš, long-term planning of water

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business practices. However, the managing Director expressed the opinion that the utility may be too small for such type of cost accounting exercise.

[14] *See EBRD's "Strategy for Croatia", November 19, 2002 for more detailed discussion of the macroeconomic and current Croatian investment environment. Page 21.*

and wastewater services in the RAD service area is undertaken at the regional level in cooperation with the Šibenik water utility, which serves as the regional hub for water services in the county. The Šibenik utility develops the county-level development strategy and is subsequently responsible for obtaining funding for and coordinating any major capital investment works.

The specific development plans for the RAD service area are embodied in a Medium Term Plan, which is also developed by the Šibenik utility in cooperation with RAD. This is essentially a conceptual strategy for development, and does not incorporate any detailed designs or budgets. RAD does not have the in-house capacity to undertake detailed engineering designs, and generally outsources this work or relies upon the staff of the Šibenik utility.

RAD, the municipality of Drniš and its fellow co-owners of RAD (Promina Oklaj and Ruzič) are trying to develop ways to finance a new wastewater treatment facility for their community.[15] In general, this association of municipalities may be too small to finance wastewater treatment strictly from their own resources. A region-wide solution will be necessary to solve the problem of financing a sewerage treatment facility.

IV.2 Technical Review

IV.2.1 Water Services

RAD's service area covers a population of approximately 10,000 inhabitants and includes approximately 70 km of pipelines[16]. RAD sources all of its raw water – averaging approximately 3,500 m^3/day - from the river Čikola.[17] The abstraction point is very close to the river's source, and the quality of water is generally high[18], requiring chlorination[19] but not filtration. The utility estimates that the quantity of raw water from the river is more than adequate to meet its medium term needs. There have been no systematic studies of the Čikola aquifer that would substantiate this view, however.

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[15] *RAD, in conjunction with the Sibenik Service Provider, has developed a medium term financial plan. However, this plan is conceptual (in nature) only, and provides limited analysis with respect to potential sources of financing.*

[16] *There are some discrepancies relating to the total length of the piped network. IMGD, the consultants who undertook the leakage reduction study, estimate the piped network at 70 km, whereas RAD estimates the total network to be more than 300 km. Because there is no comprehensive system map, we have used the more conservative estimate of 70 km for the purposes of this report.*

[17] *According to the utility, there are no private wells in the area.*

[18] *Because there are no upstream users, the utility is not concerned about contamination.*

[19] *The utility chlorinates primarily to guard against contamination from the pipe network, not to address contamination in the source water.*

The utility's treatment capacity is currently 200 ℓ/second. This capacity is limited by pump capacity (there are four pumps, each capable of handling 50 ℓ/second). Chlorination capacity is more than adequate at 0.4 mg/ℓ/second. The utility pumps water into its distribution system almost exclusively at night in order to reduce its electricity related costs. The RAD system is gravity-fed, with pressure throughout the system varying but generally within adequate ranges, and customers receive water 24 hours per day.

The distribution system serves 4,700 household connections[20] and 200 commercial/industrial connections[21]. These numbers equate to a coverage ratio of 100% within the current service area. All connections are metered and billing, which is undertaken on a monthly basis, is based on actual consumption.[22] Very little information is available on meter accuracy and there appears to be no systematic process for checking meter performance. Meters are repaired or replaced only when a problem is noted.

While there are no currently un-served customers within the RAD service area, the utility has expressed an interest in expanding its production capacity in order to sell water to consumers in the Dalmatinska Zagora, an inland area located within the boundaries of the Split and Šibenik service areas where the population currently relies on wells water[23]. During the dry season, this area experiences water shortages, and as a result, RAD believes there is a viable market for more reliable piped services.

According to RAD's management, the utility is currently only undertaking preventive and regular maintenance where possible and financially feasible. There has been limited additional capital investment due to insufficiency of funds provided by the current tariff structure. Despite these limitations, RAD is currently reconstructing the water distribution network in the nearby villages of Promina and Ruzič.[24] Once this project is complete, the utility estimates that the network will be 99% rehabilitated. After rehabilitation, they will turn their focus to making the existing system work

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[20] *Some households have two connections – one for domestic water use and one providing water for irrigation purposes. In these cases, the household pays two separate connection fees and receives two bills.*

[21] *The utility does not distinguish between commercial and industrial customers for tariff or billing purposes.*

[22] *The one exception to this is a single apartment building in the town of Drniš that has a communal meter for the entire building. Individual units within this building are billed on the basis of their proportional share of total square meters of living space within the building.*

[23] *According to RAD, these are not technically "wells" that draw on the groundwater table, but a sort of underground reservoir for the storage of rainwater.*

[24] *Funding for this project (on the order of USD 800,000) is being provided by USAID and Hrvatska Voda.*

more efficiently. The main objectives in this area are related to leakage reduction.

Most current maintenance and repair efforts are geared towards reducing water loss when lines break (or pollution when a sewerage line breaks). However, water losses are not addressed in the Medium Term Plan because this Plan is meant to address major capital investments. Accordingly, the utility has found it difficult to find funding to support ongoing leakage reduction programs and the procurement of equipment needed to support them. Despite its attempts to address water losses through its maintenance program, its officials estimate that system losses are about sixty-seven 67%[25].

An IMGD Engineering study[26] financed by USAID (see Table 3, below) indicates that in 2001, RAD produced 1.6 million m^3 of water. Households used about 428,000 m^3 of water and Businesses about 97,000 m^3 of water, resulting in total losses of 1.1 million m^3 of water.

Table 3: RAD Production, Delivery, and Estimated Water Losses (2001)

	Cubic meters (m^3)	Cubic meters (m^3)
RAD Water Production (m^3)		1,616,000
Water Delivery Households (m^3)	428,000	
Water Delivery Businesses (m^3)	97,000	
Subtotal Water Delivered		525,000
Water Loss		1,091,000 (67.5%)

Source: IMGD Engineering. April 7, 2003
Booz Allen Hamilton, 2003

IV.2.2 Wastewater Services

RAD collects wastewater from 1,000 households and 100 businesses through its piped sewerage network. There is no facility for sewage treatment, and raw sewage collected by RAD is dumped directly into the Čikola river.

The approximately 4,000 unconnected households and 100 unconnected businesses rely on septic tanks for sewage disposal. These septic tanks are generally of poor construction, and the utility estimates that most are leaking and causing groundwater contamination. Private companies empty septic tanks, and no information is available regarding where this

[25] *The substantial sixty-seven (67%) percent loss rate may be explained in part through theft, actual losses, and, perhaps inefficient metering.*
[26] *See IMGD report entitled, "Physical Inspection of Drnis Water Distribution Network" April 7, 2003. Page 4.*

sewage is disposed. The utility assumes that it too is dumped into the river, however.

RAD has undertaken some preliminary designs for a sewage treatment facility, however it is not yet sure whether this facility would provide just mechanical or also biological treatment of sewage. It estimates that the cost of such facility will be on the order of HRK 100 million (USD 16.3 million).

IV.2.3 Capital Investment

The process for obtaining funding for and carrying out capital investment works is unclear and inconsistent in Croatia. This is mostly due to the country's short history and the lack of any formal rules governing the roles and responsibilities for capital works. Given the lack of a clear *de jure* procedure for capital investment, the process we identified in Drniš is a *de* facto, locally-specific one that has grown out of practice in recent years.

To be considered for funding, most capital investments made by RAD need to be incorporated into the Medium Term Plan developed jointly by RAD and the Šibenik water utility. Once a project becomes part of the Medium Term Plan, RAD generally works with the Šibenik water utility to apply for funding from HV for a feasibility study. Following completion of the feasibility study, the Šibenik utility applies for a building permit from the MEPP. This is one of the most time-consuming stages in the capital investment process, requiring national-level authorization for local works.

Once the building permit is received, the Šibenik utility issues a tender for the project. In theory, funding for the capital works may come from a variety of sources, including:

- **Hrvatska Voda** provides funding upon request for the construction of capital assets;
- The county tax paid by **RAD** to the Šibenik utility is, in theory, meant to pay for capital investments in the RAD service area;
- The **Šibenik utility** provides funding for some works directly out of its budget; and
- Through their share of ownership in RAD and the tariffs paid by consumers within their political boundaries, the **municipalities of Promina and Ruzič** provide funding as well.

All loans for capital works come from HBOR, and loan guarantees are provided by HV.

IV.2.4 Water Demand Trends

As previously stated, RAD provides water services to 4,700 households and 200 businesses. According to the service provider's management team, there are currently no un-served customers within the RAD service area. In addition, RAD managers don't expect to see local area demand for water grow over the medium term. RAD's management has expressed an interest, nevertheless, in expanding the utility production capacity in order to sell water to consumers of the neighboring community of Dalmatinska Zagora.

Table 4, below, provides an estimate of potential future water delivery for RAD over the medium term. The forecast is derived from discussions with water utility management, a consulting report produced in 2000[27], and our best estimates. As shown, water delivered to households is not expected to increase significantly over the medium term. Based on the current level of repairs and rehabilitations, the water loss level (percentage) is expected to modestly decline. Regardless, RAD intends to invest in water loss detection equipment and in repairing pipes and fixtures to reduce system-wide water losses. Actual water losses may decline more rapidly if RAD is more aggressive in its repair and leakage reduction efforts[28].

Table 4: RAD - Estimate of Water Production, Delivery and Losses[29]

	2001	2002f	2003f	2004f	2005f
WATER PRODUCTION (M^3)	1,616,000	1,600,000	1,600,000	1,600,000	1,600,000
WATER DELIVERY (M^3)					
Households	428,000	443,700	450,000	455,000	460,000
Industry	97,000	104,580	105,000	108,000	110,000
Subtotal	525,000	548,280	550,000	563,000	570,000
Estimated Losses	1,091,000	1,051,720	1,050,000	1,037,000	1,030,000
Est. (%) Losses	67.5%	65.7%	65.6%	64.8%	64.3%

Note: F=forecast; Est=Estimate
Booz Allen Hamilton, 2003

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[27] *See "Elaborat O Gospodarskoj Opravdanosti Poduzeca Za Vodoopskrbu I Otale Kommunalne Djelatnosti." 2000. By Consulting-Kapitanovic.*

[28] *However, in various conversations, utility officials indicated that current and future water loss rates may be significantly lower due to flow meters, and more aggressive pipe and other maintenance. The level of water losses should be analyzed (and, reviewed) with a degree of caution.*

[29] *This forecast combines IMGD's Consulting Report, Consulting-Kapitonovic's Report, discussions with service provider management, and BAH estimates. It assumes only marginal changes and investments in the service provider to reduce water losses.*

IV.3 Financial Review

IV.3.1 Customer Billing and Collections

RAD's Director and Chief Engineer indicated that all household's and businesses were metered for their water usage. Approximately 4,700 households and 200 businesses are metered. All customers (households and businesses) are billed based on their metered consumption. The utility bills and collects directly from their customers. Four (4) utility staff members are assigned the task of billing and collections. The head of the accounting and finance Department stated that the utility water collection rates average around 70%.[30] RAD collects wastewater fees only from those customers connected to the wastewater collection network.

IV.3.2 Tariff Description and Level of Cost Recovery

The Municipality of Drniš in consultation with the municipalities of Promina and Ruzič sets water and sewerage tariffs in the RAD service area. The tariff is a combined one for water, wastewater, and solid waste services. The tariff is structured in six layers as depicted in Table 5, below.

Table 5: RAD d.o.o. Tariff Structure

Variable:	Tariff	Measurement Unit
(1)	Water consumption	Volumetric (m³)
Fixed:		
(2)	Meter maintenance fee (RAD)	
(3)	VAT (Ministry of Finance)[31]	22%
(4)	County tax (Šibenik Utility)	Volumetric (m³)
(5)	Environmental tax (HV)	Volumetric (m³)
(6)	Extraction fee (HV)	Volumetric (m³)

Source: The Institute for Public-Private Partnerships (IP3), Inc., April 2003
Booz Allen Hamilton, 2003

[30] *The BAH team asked for more detail regarding the collection rates. However, there was only limited time for collecting and analyzing the data. RAD utility does not age their receivables. They simply record payments when received (regardless of the period for which payment was made). In the future, it would be advisable for the utility to age any outstanding receivables.*

[31] *In the case of RAD's water utility bill, the VAT component would be applied to only the water consumption fee. If RAD had a municipal service fee for sewerage, the VAT would be applied to that component of the tariff schedule only.*

There are two customer categories: domestic, and commercial/ industrial. Each customer category is charged a flat volumetric rate for water consumption. If there is a shortfall in collection of tariffs, that shortfall is allocated proportionately across all six parts of the tariff.

Table 6, below, illustrates the tariff build up by layered component. A cursory review indicates that local domestic water tariffs have generally not increased since FY 2000. The municipal governments of Drniš, Promina, and Ruzič set tariffs for the RAD service area. Through their participation in the Steering Committee, they decide by consensus when a tariff increase is required, and the request for the increase is brought to the full municipal councils of the three towns. Discussions with RAD officials indicate that they have attempted to increase tariffs several times over the past two years but were met with substantial local community opposition.

Table 6: Water Tariff Structure (in HRK/m³)

Household Tariffs	1998	1999	2000	2001	2002
(1) Water Consumption (RAD)	1.21	2.25	3.21	3.21	3.21
(2) Meter Maintenance fee (RAD)[32]	15.81	15.81	19.76	19.76	19.76
(3) VAT (MOF)	0.27	0.49	0.71	0.71	0.71
(4) County Tax (Sibenik Utility)	1.58	0.75	0.87	0.87	0.87
(5) Environmental Tax (Croatia Water)	0.81	0.85	0.90	0.90	0.90
(6) Extraction Fee (Croatia Water)	0.85	0.72	0.80	0.80	0.80
Total	4.72	5.06	6.49	6.49	6.49
Business					
(1) Water Consumption (RAD)	1.99	5.50	6.20	6.20	6.20
(2) Meter Maintenance fee (RAD)	110.5	110.5	137.96	137.96	137.96
(3) VAT (MOF)	0.43	1.21	1.36	1.36	1.36
(4) County Tax (Sibernik Utility)	1.58	0.75	2.09	2.09	2.09
(5) Environmental Tax (Croatia Water)	0.81	0.85	0.90	0.90	0.90
(6) Extraction Fee (Croatia Water)	0.85	0.72	0.80	0.80	0.80
Total	5.66	9.03	11.35	11.35	11.35

Booz Allen Hamilton, 2003

RAD's current water tariff structure currently does not have automatic inflation adjustment mechanisms (escalators) to accommodate increases in the cost of production inputs due to inflation. One of the near-term improvements that the municipality and RAD should undertake is to allow

[32] *Based on number of meters (and, meter size) 3/hh – Flat monthly fee not based on consumption levels.*

the tariff structure to increase in line with a basket of RAD's operating expenses (i.e., electricity and fuel).

According to a 2001 report by HV, the average household price of water in Croatia was HRK 4.88 /m^3 in 2001 (or, Euro 0.63/m^3). In general, prices varied from HRK 2.44 / m^3 to HRK 6.94 / m^3. In comparison to the Croatia average for fiscal year 2001/2002, RAD's locally charged household water consumption tariff (at HRK 3.21/ m^3 for fiscal year 2002) is in the lower-to- middle range of Croatian service providers. This explains partially whey the revenues collected from household water fees do not cover full economic costs of water supply (and, wastewater treatment). As a result, RAD's water supply network is in relatively poor condition. The relatively high percentage of leakages in public water supply best illustrates the shortage of funds (necessary for proper maintenance and development of the network). Worst, RAD's tariff is currently barely sufficient for financing some of its operational expenses (salaries, electricity, fuel etc.,) and only essential maintenance and the most urgent of (repair) investments.

IV.3.3 Cost and Value of Water

Potable water is an economic good and delivery of water to consumers has legitimate costs that have to be recovered from those consumers. Management of water resources has to be economically efficient and environmentally sustainable. Cost recovery is essential to ensure efficient and sustainable operation of the system. The latter includes the need to ensure that maintenance costs, debt service and depreciation costs are covered. The price of water, or tariff charged to consumers needs to reflect these costs for operational sustainability to be ensured. Unfortunately, it appears that RAD's tariff structure neither covers depreciation (amortization) nor recovery of operational costs.

Circumstances in Drniš are not dissimilar to many Eastern European (Balkan) countries and could be described as a "low-level equilibrium trap", in which the quantity and quality of services provided are poor in large part because revenues do not match expenditures. The result is that maintenance is sub-optimal and services deteriorate. Operation and maintenance (O&M) costs tend to escalate (as do the subsidies needed to cover them) as a result of these imbalances.

Many water sector parameters indicate that RAD Drniš is in a similar position to many water utilities in developing countries. Comparisons are provided in Table 7, below, that indicates that in terms of operational efficiency measures, RAD has significant scope for operational efficiency improvements.

IV.3.4 Average Price of Water in Relation to Net Salary

Precise data on the relationship between the average cost (expenses) paid by Croatian household water consumers and their income apparently does not exist. Nevertheless, some comparison of water prices and household income can be undertaken. The average annual consumption of water by Croatians is estimated at 60 m^3 per user per year[33]. Multiplying the average water use by the average 2001 Croatian tariff of 4.88 implies that Croatians paid on average HRK 2.93 for water in 2001. According to the Croatian National Statistics Institute, the average 2001 net monthly salary was HRK 3,055. The 2001 average annual net salary is estimated at HRK 36,660. By dividing total average water payment by total annual net salary the total cost of water consumption by an average Croatian household water user is less than 1% of net annual salary[34]. Therefore, the economic capacity of Croatian water users to pay higher tariffs should not be a constraint to future tariff adjustments.

Table 7: Comparison of RAD Drniš Operational Indicators With Those of Other Utilities

Parameter	Unit	Drniš Water Distribution Network	Other Developing Countries	Developed Countries
Unaccounted for Water	Percent (%) annual Production	67.5%	40 – 50 %	8 – 17 %
Rate of bill collection	Percent (%)	70%[35]	40 – 70 %	98 %
Organization efficiency	Employees per 1000 Connections	9	10 – 25	2 - 4

Source: World Bank OED Technical Paper No 5, Laktasi Water Utility Co. BAH 2003
Booz Allen Hamilton, 2003

[33] *Hrvatske Vode, 2001. Statistical Table.*

[34] *A more informative method of analysis would be to compare average Croatian water prices to that of household income (rather than net salary). Household income figures were not available to the consultants at the time of this analysis. Nevertheless, a general conclusion from this type of comparison is that the average cost of water in Croatia for the average Croatian water user is not significant. However, in former war torn areas where employment and income levels may be lower than in Zagreb (for example) the cost of water may represent a significantly greater share of net salary or household income.*

[35] *The seventy- (70%) percent bill collection rate was provided to BAH/IP3 Consultants. With the time available, the consulting team was unable to substantiate this modest level of collection.*

V. Financial Performance

The analysis of RAD's financial results over the past three years is based on a review of the firm's un-audited financial accounts as well as meetings with RAD's officials.[36] A cursory review of these accounts indicates that they do not fully adhere to international audit standards in a number of areas (e.g.; treatment of receivables and computation of cash flow) as well as fail to provide a sufficient level of financial information regarding the cost and revenues associated with the firm's other small businesses (i.e.; solid waste management, cemetery clean-up).

V.1 Profitability Analysis

RAD does not have a comprehensive financial (cost) accounting software program. Consequently, the financial figures supplied in Table 8 lack the necessary accuracy to allow for a differentiation of the firm's primary business (water) and other businesses.

[36] *RAD d.o.o. Drnis has been audited only one time over the past five years. The audit was conducted by the national government to determine that RAD was in compliance with its VAT payment obligations. RAD, as a small incorporated business, is apparently under not legal obligation to have its accounts audited on a regular basis.*

Table 8: RAD d.o.o. Annual Cash Financial Statement[37] (in '000 HKR)

		2000	2001	2002
Revenues	Total Delivered Water Revenues	2,184.93	1,921.50	1,903.80
	Meter Maintenance	988.80	1,123.80	1,165.40
	Sewerage	52.50	50.90	54.70
	Connection Fees	58.10	169.60	245.60
	All Other Revenues	790.80	846.60	989.20
	Total	4,075.13	4,112.40	4,358.70
Costs	Electric Energy	463.20	785.20	822.50
	Fuel	133.50	166.60	133.90
	Materials for the Pipe Network	431.90	481.30	299.60
	Gross Salaries	2,156.20	2,229.30	2,253.60
	Water	910.20	1001.50	982.20
	Solid Waste	339.20	352.80	383.70
	Administration	906.80	875.10	887.80
	Total	5,341.00	5,891.80	5,763.30
	Net Operating Income	(1,265.90)	(1,779.40)	(1,404.60)

Source: RAD Drniš d.o.o. Financial Statements.
Booz Allen Hamilton, 2003

RAD's financial statements show that the company has suffered substantial losses over the past three years with profit margins each year of less than –30%. These poor results reflect the inherent weaknesses of the company's water collected revenues. They declined by 13% in nominal terms during thee three years under the combined weight of stagnating demand, lack of tariff readjustments and what amount to more than likely declining invoices collection rates. The current misalignment between water tariff levels and costs is further compounded by the fact that RAD existing costs structure fails to take into account adequate levels of depreciation and capital investment costs as well as extraordinary losses generated by un-collected bills. The inclusion of these items in RAD financial accounts would weaken even more the company's financial standing.

[37] *RAD's Chief Financial Officer calculated the figures provided in Table 8 to come up with a "water only income state". However, the utility does not have cost accounting software, nor does it allocate costs among its different cost centers. As a result, some figures with respect to electric energy, gross salaries (etc.) may overstate water only expenses (i.e.; part of these costs should be allocated to different cost centers). For example, the solid waste expense may include some sewerage type functions undertaken by the utility but may also include some street cleaning figures etc.. RAD does not have audited financial statements making the task of financial data verification difficult. The figures supplied for the income statement in Table 8 represent the best "approximate" estimate of water only financial operations.*

V.2 Cost Structure Analysis

Aside from labor, RAD's other operating costs appear to be in line with prevailing Croatia water utility cost structures with water, electric energy, fuel and gross salaries amounting to 17%, 14%, 3% and 49%, of total operating costs in 2002, respectively. More importantly, the existing company cost structures suffers from the high level of its costs that are fixed (e.g., labor and administration). The prevalence of these fixed costs as a portion of total costs clearly indicates that the company's financial difficulties will only be met through a combination of efficiency improvements to limit and/or lower these fixed costs and sharp increase in revenues. Likewise, reduction in the current level of technical losses could contribute significantly towards restoring the company's financial equilibrium since 17% of its costs are linked to the amount of water it uses and we know that currently only 33% of these costs generate any revenues (i.e.; technical losses are 67%).

According to our own estimates, if RAD's technical losses were reduced to more normal level of 25%, assuming a constant level of sales, this would translate into an annual cost reduction of 9.5% of its total costs. Such reduction of costs would result for the Year 2002 in a reduction of RAD operating losses by HRK 549,000 or 39%. If were to include the impact on electricity consumption that any such reduction in technical losses would have (i.e.; about 50% or another HRK 400,000 – 28% of Year 2002 losses), we can easily see that the financial dividends associated with RAD's ability to limit the level of its technical losses would be very significant.

VI. Financial Projections

VI.1 Income Statement and Financial Ratios

The financial analysis provided follows the same approach as the economic analysis. Costs and benefits are however based on market prices including taxes and duties not normally included in the economic analysis.

In determining future service provider tariff levels (and, potential debt structure), we considered the service providers estimated future revenue requirements. Some of the assumptions with respect to the utility have already been outlined. However, one key assumption with respect to RAD's future income statement projection is that the HRK 175,000 for leakage equipment detection and repair that RAD requires be provided as a grant or subsidy.[38] Further, service provider revenues should in aggregate be sufficient to meet all incurred expenses and to ensure the service providers financial viability. Therefore, the revenues should be sufficient to cover all operating expenses (and, potential debt service obligations). In addition, the service provider's finances should provide for contingencies, such as bad debts or emergency repairs.

The following financial assumptions were made in developing the financial projections:

- **Inflation/exchange rate**. Croatia's current inflation rate is hovering between 4 and 5% per annum. However, the financial forecast was derived in real terms (net of inflation).
- **Materials, electricity, and supporting services.** The real costs of electricity will rise marginally over the forecast period. However, with a system wide technical loss reduction-program in place these expenditure items could conceivably be reduced over the medium term.
- **Water/Wastewater production.** The overall production of water is assumed to drop somewhat in the first and second year of the forecast as a result of more focused demand management and loss reduction programs.
  - Under the base case scenario, the service provider water loss rate was reduced from its current 67% to around 40%. We assumed that the additional water loss reduction expenses and leakage detection equipment (HRK 175,000) would be grant financed. The new equipment and maintenance would be sufficient to reduce water loss rates to 40%.

[38] *BAH Consultants used this grant/subsidy for leakage detection equipment due to the absence of any potential debt financing currently available.*

  - In the second scenario, the Optimistic Case, the service provider would through aggressive maintenance work reduce water losses to around 25%.
- Tariff projection. The tariff projections include an increase HRK 1 for fiscal year 2004 for both household and businesses from their current HRK 3.25 and HRK 6.2 levels, respectively. In fiscal year 2006, an additional HRK 1 was also assumed.

Tables 9 and 10 below, illustrate pro-forma income statement forecasts and financial ratios. Given the abovementioned assumptions, under the Base Case (water loss rates approach 40%) RAD's financial position would improve. However, RAD would run deficits until fiscal year 2009. Under the Optimistic Case (water loss rates reduced to 25%) RAD's financial position would dramatically improve, approaching profitability by 2007.

Our sensitivity analysis shows that the break even level of household water consumption tariff was determined to be HRK 6.10. The break even level of business tariff was determined at HRK 9.10.

Table 9: RAD d.o.o. Projected Income Statement – In HRK Constant 2002 – Base Case

INCOME STATEMENT	2001	2002	2003	2004	2005	2006	2007
Revenues							
Household Water	1,373,878.40	1,391,657.47	1,843,447.58	1,861,882.05	1,880,500.88	2,350,447.42	2,373,951.90
Business Water	601,398.45	609,181.88	714,511.39	721,656.51	728,873.07	869,079.91	877,770.71
New Connections	141,375.00	245,600.00	163,733.33	0.00	0.00	0.00	0.00
Sewerage	50,900.00	50,900.00	50,900.00	50,900.00	50,900.00	50,900.00	50,900.00
All Other Revenue	846,600.00	846,600.00	846,600.00	846,600.00	846,600.00	846,600.00	846,600.00
Meter Maintenance	1,123,800.00	1,123,800.00	1,123,800.00	1,123,800.00	1,123,800.00	1,123,800.00	1,123,800.00
Total Sales	4,137,951.85	4,267,739.35	4,742,992.31	4,604,838.56	4,630,673.95	5,240,827.33	5,273,022.60
Expenses (except Depreciation)							
Maintenance	481,300.00	481,300.00	481,300.00	481,300.00	481,300.00	481,300.00	481,300.00
Salaries	2,229,300.00	2,229,300.00	2,229,300.00	2,229,300.00	2,229,300.00	2,229,300.00	2,229,300.00
Solid Waste	352,800.00	352,800.00	352,800.00	352,800.00	352,800.00	352,800.00	352,800.00
Electricity	785,200.00	785,200.00	785,200.00	785,200.00	785,200.00	785,200.00	785,200.00
Fuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Property Tax Allocation to Taxes Payable	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Overheads (except Depreciation)	3,848,600.00	3,848,600.00	3,848,600.00	3,848,600.00	3,848,600.00	3,848,600.00	3,848,600.00
Depreciation and Amortization	0.00	0.00	0.00	4,387.20	8,774.40	8,774.40	8,774.40
Cost of Goods Sold	4,998,598.81	5,013,481.01	5,025,129.82	4,802,896.91	4,577,208.83	4,584,407.17	4,591,677.50
GROSS PROFIT	-860,646.97	-745,741.66	-282,137.52	-198,058.35	53,465.12	656,420.16	681,345.10
Administrative Expenses	875,100.00	875,100.00	875,100.00	875,100.00	875,100.00	875,100.00	875,100.00
OPERATING PROFIT	-1,735,746.97	-1,620,841.66	-1,157,237.52	-1,073,158.35	-821,634.88	-218,679.84	-193,754.90
Non Operating Income							
idies and Debt Forgiven	0.00	175,600.00	0.00	0.00	0.00	0.00	0.00
Total Non-Operating Income	0.00	175,600.00	0.00	0.00	0.00	0.00	0.00
EBIT	-1,735,746.97	-1,445,241.66	-1,157,237.52	-1,073,158.35	-821,634.88	-218,679.84	-193,754.90

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Table 10: RAD d.o.o. Projected Income Statement – In HRK Constant 2002 – Optimistic Case

Income Statement	2001	2002	2003	2004	2005	2006	2007
Revenues							
Household Water	1,373,878.40	1,391,657.47	1,843,447.58	1,861,882.05	1,880,500.88	2,350,447.42	2,373,951.90
Business Water	601,398.45	609,181.88	714,511.39	721,656.51	728,873.07	869,079.91	877,770.71
New Connections	141,375.00	245,600.00	163,733.33	0.00	0.00	0.00	0.00
Sewerage	50,900.00	50,900.00	50,900.00	50,900.00	50,900.00	50,900.00	50,900.00
All Other Revenue	846,600.00	846,600.00	846,600.00	846,600.00	846,600.00	846,600.00	846,600.00
Meter Maintenance	1,123,800.00	1,123,800.00	1,123,800.00	1,123,800.00	1,123,800.00	1,123,800.00	1,123,800.00
Total Sales	4,137,951.85	4,267,739.35	4,742,992.31	4,604,838.56	4,630,673.95	5,240,827.33	5,273,022.60
Expenses (except Depreciation)							
Maintenance	481,300.00	481,300.00	481,300.00	481,300.00	481,300.00	481,300.00	481,300.00
Salaries	2,229,300.00	2,229,300.00	2,229,300.00	2,229,300.00	2,229,300.00	2,229,300.00	2,229,300.00
Solid Waste	352,800.00	352,800.00	352,800.00	352,800.00	352,800.00	352,800.00	352,800.00
Electricity	785,200.00	785,200.00	785,200.00	785,200.00	785,200.00	785,200.00	785,200.00
Fuel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Property Tax Allocation to Taxes Payable	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Overheads (except Depreciation)	3,848,600.00	3,848,600.00	3,848,600.00	3,848,600.00	3,848,600.00	3,848,600.00	3,848,600.00
Depreciation and Amortization	0.00	0.00	0.00	4,387.20	8,774.40	8,774.40	8,774.40
Cost of Goods Sold	4,998,598.81	5,013,481.01	5,025,129.82	4,697,212.75	4,364,256.58	4,369,325.40	4,374,444.91
GROSS PROFIT	-860,646.97	-745,741.66	-282,137.52	-92,374.19	266,417.37	871,501.93	898,577.70
Administrative Expenses	875,100.00	875,100.00	875,100.00	875,100.00	875,100.00	875,100.00	875,100.00
OPERATING PROFIT	-1,735,746.97	-1,620,841.66	-1,157,237.52	-967,474.19	-608,682.63	-3,598.07	23,477.70
Non Operating Income							
sidies and Debt Forgiven	0.00	175,600.00	0.00	0.00	0.00	0.00	0.00
Total Non-Operating Income	0.00	175,600.00	0.00	0.00	0.00	0.00	0.00
EBIT	-1,735,746.97	-1,445,241.66	-1,157,237.52	-967,474.19	-608,682.63	-3,598.07	23,477.70

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VII. Options for Private Sector Participation

In recent years, governments throughout the world have been turning with increasing frequency to the private sector for help in developing and delivering water and wastewater services. For governments facing growing demands for service, chronic operational and institutional deficiencies, and limited fiscal resources, the private sector is increasingly being recognized as a valuable source of new technology, management expertise, and investment capital. International experience demonstrates that, if properly designed, PSP arrangements can bring dramatic improvements in the quality, availability, and cost-effectiveness of water and wastewater services.

Most literature on PSP identifies five (5) options for implementing PSP projects in the water and wastewater sector[39]. They are:

- Service Contracts
- Management Contracts
- Leases
- Build-Operate-Transfer Contracts and Variants
- Concessions

While these are considered to be the main options, it is important to note that in practice, PSP arrangements are often hybrids of these models. For example, management contracts sometimes include capital investment obligations and revenue-sharing provisions common to lease agreements, and leases sometimes transfer responsibility for small-scale investment, rehabilitation, or renewal to the private sector, as is characteristic of concessions. The following sections present a brief overview of the models for PSP, cite examples of where these models are in use, and suggest some lessons drawn from international experience in the use of each option.

VII.1 Service Contracts

Service contracts are legally binding arrangements between a properly empowered government authority and a private sector contractor to perform specific, usually non-core tasks of the utility, such as meter reading and installation, operations and maintenance, information technology service design and delivery, billing and tariff collection, equipment maintenance, janitorial services, or security services, in exchange for a fee. These contracts are typically competitively bid, and are for short periods of six months to two

[39] *Although divestiture is a common means through which to privatize an enterprise, it is not commonly used in the water sector due to the social and political sensitivity of water as a strategic national resource. As a result, we have not discussed divestiture in any detail.*

years, after which they are re-bid. The responsibility for general control and supervision of the utility, as well as any capital investment in the system, remains with the public authority.

While service contracts require only a limited degree of PSP, they nonetheless provide opportunities for the introduction of competition and private sector expertise, and free the utility up to focus on its core business. Because the contract period is short, contractors are subjected to frequent competition, which encourages efficient performance and reduces the cost of the contracts. In large urban areas, different firms can be contracted in separate geographical areas to deliver the same services. Multiple contracts ensure adequate competition and enable the water authority to compare costs and performance on an ongoing basis. Service contracting can be an attractive form of PSP where there is strong political or community opposition to wider involvement of the private sector, opposition to water tariff increases, or where the utility is seeking to shed responsibility for non-core functions. Service contracts can also be used in combination with other, deeper forms of PSP.

Despite the potential long-term benefits to the population as a whole, the introduction of service contracting sometimes has a short-term negative impact on those employees working in the operations being contracted out who may be made redundant. Governments have addressed this dilemma by providing support to those employees in forming and financing private companies to compete for the service contract, or by providing retraining and severance to support employees in finding work in other professions.

Service contracts are used widely throughout the world. For example, the water utility in Santiago de Chile has contracted out services accounting for about half its operating budget, including computer services, engineering consulting services, and repair, maintenance, and rehabilitation of the network. To enhance competition, the Santiago utility has at least two service contracts for each kind of task. These contracts are re-bid every two years in order to maximize price competition.

VII.2 Management Contracts

Management contracts transfer responsibility for the operation and maintenance of government-owned utilities to the private sector. Under such contracts, ownership of the water utility and responsibility for service provision remain with the government. Likewise, the bulk of the commercial risk and all the capital and investment risks remain with the public authority. Management control and authority, however, is transferred to a private operator, which applies its expertise to improve management systems and

practices. Management contracts are generally three to five years in duration. Compensation may be in the form of a fixed fee, as in the case of a fixed fee management contract, or it may be linked to performance indicators, as in the case of a performance-based management contract.

Under a standard *Fixed Fee Management Contract*, remuneration to the private sector contractor is based solely on the payment of a fixed fee in exchange for the provision of specialized personnel who oversee the management of the system.

More sophisticated *Performance-Based Management Contracts* provide for the introduction of greater incentives for efficiency by defining performance targets or contract milestones and basing remuneration, at least in part, on their fulfillment. One variant of this model provides for a profit sharing incentive, in which the operator's remuneration is a combination of a fixed fee plus a share in the profits of the utility. Both the performance-based management contract and the profit sharing variant are effective tools for ensuring that operating and commercial risks are shared by the management contractor. However, under both models, the public authority still bears the financial risk associated with its responsibility for capital investment.

Performance-based management contracting provides the management contractor with incentives to improve operating efficiency and achieve timely compliance with the performance milestones in its contract. An advantage to these contractual models is the ability to create incentives for the contractor to tackle issues (such as staff development) that are not revenue generating in the short term, but that may establish a foundation for more efficient and sustainable performance over the long term.

Management contracts are most beneficial where the main objective is to rapidly enhance a utility's technical capacity and its efficiency in performing specific tasks, or to prepare for a deeper level of PSP. They are also attractive when there is strong political or public resistance to water tariff increases, where there is concern about handing over control of investments to the private sector, or where there is too little information and data on which to base a longer-term arrangement such as a lease or concession.

Management contracts provide little potential for expanded service coverage because they do not require the private operator to make any capital investments. As a result, they are not recommended if a government has as one of its main objectives accessing private finance for new investments.

The performance-based management contract is the most common management contract model in use around the world today. Some recent examples include:

- The Government of Venezuela awarded a performance-based contract to a Spanish firm in 1997 in order to improve cash flow, creditworthiness, and service in the water sector in Monagas State.
- In Gaza, Palestine, a performance-based management contract was awarded to a private consortium with the goals of increasing the quantity of available water by improving the efficiency of operations and distribution; by improving the quality of the water supply and of wastewater effluent; by improving management through better operations, revenue collections, and customer service; and by strengthening utility institutions through long-term planning and training.
- The Government of Jordan awarded a management contract with a profit sharing incentive aimed at addressing chronic operational, management, and financial deficiencies characterized by high levels of unaccounted-for water, rapidly increasing incremental costs of water, poor financial performance, and inadequate cost recovery mechanisms.

These experiences, and others, have shown that the incentive-based approach of performance-based management contracts is the most effective in producing positive results for both the public and the private sectors.

VII.3 Lease Agreement

Under a lease, a private firm (Lessee) leases the assets of a utility from a properly empowered government authority (Lessor) and assumes the responsibility for operations, maintenance, and asset renewal for a period usually between ten and fifteen years. Typically under a lease, the tariff is used to pay the "Lessee Fee", which remunerates the Lessee for his costs, plus a reasonable return. The remainder of the tariff goes to the government and is used to fund capital investment in system expansion, rehabilitation, and other improvements. As the Lessee's fee is dependent upon tariff revenues, the lessee assumes much of the commercial risk of the operations.

The private operator's remuneration is directly linked to the charges it collects from customers under a well-structured lease. From these charges, the Lessee pays the public utility a rental fee intended to cover the public utility's capital costs for system expansion and rehabilitation. The Lessee's profitability will therefore depend to a large degree upon how much it can reduce costs, while still meeting the quality standards set forth in the lease. Best practice leases have built-in incentives that encourage the private operators to implement efficient billing and collection procedures to improve the collection ratio from customers (including government agencies). The Lessee also has an incentive to implement aggressive policies aimed at expanding service coverage to increase the revenue base (although it is

important to note that the government retains responsibility for carrying out and financing expansion), to reduce operating costs in order to maximize profits, and to carry out regular preventative maintenance to increase the reliability and longevity of plant and equipment.

Under a lease, the public utility retains title to the assets and bears the responsibility for financing and planning capital investments and rehabilitation. It is, therefore, incumbent upon the government to raise financing and coordinate its capital investment program closely with the private contractor's operational and commercial program.

Leases are most appropriate where there is scope for large gains in operating efficiency but only limited need or scope for new investments. Leases have also sometimes been advocated as stepping-stones toward a deeper level of PSP through concessions. However, their administrative complexity and the demands they place on governments are nearly as great as those of concessions, so a lease is a much bigger first step than a management contract. Due to their complexity, leases generally require that an independent regulatory body be established to monitor and enforce the private operator's fulfillment of its obligations.

Leases have been used widely in the water sector in France and Spain, and are currently in place in Guinea, the Czech Republic, and Senegal.

VII.4 Build-Operate-Transfer (BOT) Contracts and Variants

Build-Operate-Transfer (BOT), Build-Own-Operate (BOO), and similar arrangements are contracts specifically designed for greenfield water supply or wastewater projects or investments in water supply and/or wastewater infrastructure that require extensive rehabilitation. Under such arrangements, the private sector typically designs, constructs and operates facilities for a limited period of 15 to 30 years, after which time the contractor relinquishes all rights or title to the assets to the public utility. Under a BOO contract, the assets remain indefinitely with the private partner.

In a BOT for bulk water, the government or the distribution utility will typically pay the BOT partner for water from the project at a price calculated over the life of the contract to cover its construction and operating costs and provide a reasonable return. The contract between the private partner and the utility is usually on a "take-or-pay" basis, obligating the utility to pay for a specified quantity of water whether or not that quantity is consumed. This places all demand risk on the distribution utility. Alternatively, the distribution utility might pay a capacity charge and a consumption charge, an arrangement that shares the demand risk between the utility and the private partner.

Similar arrangements, called "offtake" agreements, are used for wastewater treatment BOTs. In this case, the government is obligated to pay the private partner to treat a pre-defined minimum volume of wastewater, whether or not that quantity is actually delivered for treatment.

These types of arrangements have not been used extensively in the water and wastewater sector for a number of reasons. While they are attractive for new plants that require large amounts of financing, such as large water treatment plants, bulk water supply BOTs are not suitable in systems with such major problems as high unaccounted-for-water or poorly maintained water distribution systems, where the increase in supply and pressure can further exacerbate problems in the system. Another problem with BOTs is that, because water production and distribution are the responsibility of separate entities, it can be very difficult to tie increases in productive capacity with increases in demand.

While the BOT model can be a very attractive way of generating the financing needed to construct a new wastewater treatment facility, it is only viable if government is prepared to charge consumers a tariff that will fully remunerate the BOT operator for its full cost of operation, maintenance, and depreciation. In most cases, tariffs for wastewater treatment are bundled with those for water. When this is not the case, it is very difficult, if not impossible, to collect payment for services.

Effective implementation of BOT type contracts requires careful attention to the design of tender documents and can involve a relatively lengthy bidding process. Experience with some BOTs shows that they achieve some savings in capital construction costs and facilitated more rapid investment in infrastructure. However, they can be an expensive way of substituting private debt for public debt if there is a take-or-pay contract for sale of bulk water to the retail utility. Additionally, many BOTs have failed to deliver optimal outcomes for government or consumers because the government's agency responsible for negotiating allowed too much of the risk to remain with government, especially where foreign exchange guarantees were provided, or where take-or-pay contracts were signed.

BOTs and their variants have been used for water treatment in such countries as Malaysia, Australia, and for sewage treatment in Chile and New Zealand. In Zagreb, the first-ever BOT for wastewater treatment in Croatia has been initiated with funding from the EBRD.

VII.5 Concessions

Under a concession, the private contractor, or Concessionaire, bears overall responsibility for the services, including operation, maintenance, and

management, as well as capital investments for rehabilitation, renewal, and the expansion of services. The fixed assets either remain the property of the public authority or revert to public ownership at the end of the concession period. Concession contracts usually have a duration of twenty to thirty years, depending on the level of investments and the period required for the Concessionaire to recover its investments plus a reasonable rate of return.

Concessions are typically awarded based on price, with the contract going to the bidder proposing to operate the utility and meet the investment targets for the lowest tariff. The concession is governed by a contract which sets out such conditions as the main performance targets for coverage and quality, performance standards, arrangements for capital investment, mechanisms for adjusting tariffs, and arrangements for dispute resolution. Penalties are imposed if the Concessionaire fails to comply with the performance targets specified in the contract.

The Concessionaire is paid for its services directly by the consumer, based on the contractually set tariff, which is adjustable over the life of the contract. The Concessionaire retains the balance of revenues after paying back any taxes and charges levied on consumers by the public authority. If expenses exceed revenues, the Concessionaire must absorb these losses. Combining the responsibility for operations and investments under a concession agreement provides the Concessionaire with an incentive to make efficient decisions regarding investment and technological innovations, because the operator will benefit directly from any efficiency improvements.

The main advantage of a concession is that it passes full responsibility for operations, maintenance, rehabilitation, renewal, and system expansion to the private sector and so creates incentives for efficiency in all the utility's activities. Therefore, concessions are an attractive option where large investments are required to expand coverage or to improve the quality of services. However, concessions are administratively complex undertakings for governments, because they confer a long-term monopoly on the concessionaire and thus require rigorous monitoring and enforcement. The quality of regulation is, therefore, important in determining the success of the concession, particularly the distribution of its benefits between the concessionaire (in profits) and consumers (in lower prices and improved service).

Concessions have a long history of use in the developed world, and are increasingly being used in developing countries such as Colombia, Argentina, Bulgaria, Romania, the Philippines, and Malaysia.

VII.6 Summary and Implications

The following tables summarize the aspects of each option for PSP and the considerations for government when selecting an option

.

Table 11: PSP Options – Allocation of Key Responsibilities

Type	Asset Ownership	Operations & Maintenance	Capital Investment	Commercial Risk	Duration
Service Contract	Public	Public + Private	Public	Public	1 – 2 yrs
Management Contract	Public	Private	Public	Public	3 – 5 yrs
Lease	Public	Private	Public	Shared	8 – 15 years
Concession/BOT	Public	Private	Private	Private	20 – 30 yrs

Source: Severn Trent Water International
Booz Allen Hamilton, 2003

Table 12: What do Governments Want and Which PSP Options Delivers?

Type	Technical Expertise	Managerial Expertise	Operating Efficiency	Investment Efficiency	Investment in Bulk Capacity	Investment in Distribution System	Responsive to Customers	Insulation from Political Intervention
Service Contract	Y	N	N	N	N	N	N	N
Management Contract*	Y	Y	Y	N	N	N	P	P
Lease	Y	Y	Y	N	N	N	Y	Y
Concession/BOT	Y	Y	Y	Y	Y	Y	Y	Y

* Management contract with performance incentives

Key: *Y = Objective can be satisfied, N = Objective cannot be satisfied, P = Objective can be partially satisfied*

Source: Severn Trent Water International
Booz Allen Hamilton, 2003

Table 13: How Much do Governments Have to Offer to Get What They Want?

Type	Stakeholder support and political commitment	Cost recovery tariffs	Good information about the system	Developed regulatory framework	Good country financial rating
Service Contract	Unimportant	Not necessary in the short term	Possible to proceed with only limited information	Minimal monitoring capacity needed	Not necessary
Management Contract*	Low to moderate levels needed	Preferred but not necessary in the short term	Sufficient information required to set incentives	Moderate monitoring capacity needed	Not necessary
Lease	Moderate to high levels needed	Necessary	Good information system required	Strong regulatory capacity needed	Not necessary
Concession/BOT	High levels needed	Necessary	Good information system required	Strong regulatory capacity needed	Higher rating will reduce costs

** Management contract with performance incentives*

Source: Severn Trent Water International

Booz Allen Hamilton, 2003

VIII. Private Sector Participation in Drniš

The following issues and challenges have a direct impact on the potential for PSP in the Drniš area:

- **Asset Ownership:** There is a general lack of clarity over the legal ownership of RAD's capital assets. Although corporate ownership of the company is vested in the municipalities of Drniš (72%), Promina (16%), and Ruzič (12%), ownership of the assets themselves has not been determined. Specifically, the issue of HV's right to ownership is a complicated one. HV has provided most of the post-war funding for capital investment and, in theory, this investment is being repaid through a debt for equity swap with the utility. However, in practice, HV is not interested in taking on ownership of RAD but it is coming under pressure from Croatia's State Audit Department, which would like to see it assume its share of ownership. By law, HV cannot own more than 49% of any utility and, therefore, there is no possibility that it may own a majority share. The situation is additionally complicated because there is also a law in Croatia stating that in the war-torn areas, any capital investment funds provided by HV cannot legally form the basis of future shares in the ownership of the company receiving the funds. As a result, it is RAD's position as a utility in a war-torn area that HV does not own any portion of the company. Nonetheless, until this issue is brought to some sort of legal test, the question of ownership will remain unanswered.
- **Wastewater Treatment:** The current lack of any wastewater treatment in the RAD service area is posing an enormous environmental threat to the downstream users of the river Čikola. This environmental threat, combined with pressure from the national government to come into compliance with wastewater treatment standards in preparation for EU accession, has brought the need for investment in wastewater treatment to the forefront. However, the estimated HRK 100 million (USD 16.3 million or 24 times 2002 total turnover) required to construct a wastewater treatment facility in Drniš far exceeds RAD's financial resources.
- **Limited Potential for Tariff Increases:** As stated previously, tariff increases in the war torn areas of Croatia are still considered very controversial. The RAD Chief Executive estimates that realistically, the tariff can only be increased by 15% over the next five years while our financial analysis has established that an increase varying from 100% to 200% would be necessary to restore RAD's financial viability.

- **Regional Context:** Although the towns of Drniš, Promina, and Ruzič are located in an area that is severely economically depressed, the larger region is an economically strategic one, particularly for the tourism industry, which is one of the main drivers of the Croatian economy. The nearby seaside cities of Šibenik and Split have economies that, relative to those in the RAD service area, are thriving due to tourism. These areas are also downstream from Drniš, Promina, and Ruzič, and therefore have the most to lose from the environmental damage caused by any dumping of untreated effluent into the river Čikola. In addition, the RAD service area is adjacent to the Krka National Park, a forested area that receives in excess of 500,000 visitors per year. Because of the potential impact on tourism in all of these areas, the issue of environmental protection in the RAD service area is one that deserves regional attention.

Table 14 sets out the options for change, including the legal and technical implications and financial attractiveness, to the various types of PSP described in the previous section. We also included in our analysis, for the sake of comparison, is an option of "Doing nothing."

Table 14: Options for Change

Type of Contract	Legal Implication	Technical Implication	Financial Attractiveness	General Comment
Status Quo	▸ Company ceases to be a "going concern" ▸ No transfer of any legal or regulatory risk ▸ No legislation changes required ▸ Need to clarify HV share of ownership	▸ Company lacks the resources to fund major works or investment in wastewater treatment ▸ Company lacks in-house skills or capacity to assume responsibility for capital investment program	▸ No or very limited internal funding available to finance capital expenditure ▸ Inability to attract external private funding ▸ Likely that company will continue to suffer losses ▸ Company lacks ability to improve internal cost accounting and cost management without external assistance	▸ Generally the company's financial situation will continue to deteriorate ▸ Limited potential to improve standards of service ▸ Continued risk of environmental degradation due to lack of wastewater treatment
Service Contract	▸ Limited transfer of legal and regulatory risk ▸ No legislation or regulatory change required ▸ May be legally difficult to reduce utility staff if required	▸ A service contract could be awarded for meter installation, reading, and maintenance. This may help the utility to improve its metering program.	▸ A service contract could be awarded for billings and collections. This could have short term benefits but not likely to be long term solution ▸ No private sector funding	▸ Enables the company to engage specific skills required ▸ The small size of the RAD operation may limit the benefits to be gained from outsourcing
Management Contract	▸ No legislation or regulatory change required ▸ If pursued at regional level, RAD must sign accession agreement	▸ Can structure a performance-based arrangement with targets for UFW reduction and other technical parameters, but benefits are limited by lack of private funds for capital investment ▸ Difficult to improve capital planning or execution of capital expenditure program unless contract structured at regional level	▸ No private sector funding ▸ May increase utility's ability to attract external private funds ▸ Financial improvements possible if targets are set appropriately for cost reduction and revenue enhancement ▸ May provide resources required to improve utility's cost accounting systems	▸ Workforce sometimes unwilling to take instruction from new or outside management team ▸ Could help to strengthen overall corporate planning ▸ Size of RAD operation may be too small to justify cost of management contract – a regional solution at the county level could be more attractive and affordable

Type of Contract	Legal Implication	Technical Implication	Financial Attractiveness	General Comment
Lease	▸ Transfers much of the regulatory risk ▸ Legislative change may be required ▸ Need to clarify HV ownership issue ▸ Labor transition or redundancy issues may pose legal challenge ▸ Requires sophisticated regulatory capacity	▸ The majority of capital investment responsibilities remain in the public sector's hands ▸ Will not provide funding for construction of greenfield wastewater treatment facility	▸ Requires that a cost recovery tariff be charged ▸ Likely staff will not transfer to lessee without first payment of redundancy package ▸ Limited private sector funding ▸ Major part of commercial risk transferred to lessee ▸ May take time to arrange	▸ Complicated bidding process ▸ Takes time to prepare contract and appoint lessee ▸ Doubtful whether qualified operator would be interested in contract due to small size of RAD operation ▸ No guarantee of successful award of contract
Concession/BOT	▸ Full transfer of regulatory risk ▸ Significant legislative change likely required ▸ Must resolve issue of HV share of ownership ▸ Labor transition or redundancy issues may pose legal challenge ▸ Requires sophisticated regulatory capacity	▸ BOT could be appropriate solution for construction of greenfield wastewater treatment facility ▸ Likely to greatly improve system efficiency	▸ Requires that a cost recovery tariff be charged ▸ Investment funded by private sector ▸ Commercial risk transferred entirely to private sector ▸ May take time to mobilize external funding ▸ Likely staff will not transfer without first payment of redundancy package	▸ BOT could be good solution for construction of wastewater treatment, but due to small size of RAD operation and lack of financial resources, a regional solution is probably most appropriate ▸ Complicated bidding process ▸ Takes time to prepare contract and appoint private operator ▸ Doubtful whether qualified operators would be interested due to small size of RAD operation ▸ No guarantee of successful award of contract

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Based on our analysis of the situation in the RAD service area, as well as our understanding of the overall legal, regulatory, economic, and political climate prevailing in Croatia, we have eliminated leases and concessions as viable PSP options in Drniš. RAD's current financial situation, compounded by the lack of political support for the institution of a cost recovering tariff, make both options not only unviable from a financial standpoint, but unattractive to private potential private operators. From among the remaining options, we recommend that the following be explored in more detail.

VIII.1 Management Contract for Šibenik County

While the size of the RAD operation does not preclude a management contract altogether, it certainly reduces the attractiveness of it to potential private operators. Even if a private operator were to be interested in bidding on such an arrangement, the utility's financial situation (sustained losses) would make a management contract unaffordable. In addition, RAD's dependence upon the Šibenik utility for long range planning, financing, and execution of the capital investment program would reduce a management contractor's ability to increase the efficiency of the capital planning process.

Despite these challenges, there are significant benefits to be gained from a regional solution. Specifically, we recommend that RAD initiate a dialogue with the utility in Šibenik regarding the potential for a county-wide performance-based management contract. Such an arrangement would offer small utilities such as RAD the opportunity to tap into the management expertise of a private operator without incurring the full cost of a management contract.

This type of contract would have to be executed primarily between the Šibenik utility and a private operator, with individual utilities such as RAD signing "accession agreements" whereby they purchase a certain level of effort on behalf of the management contractor. We recommend that any management contract of this type be performance-based, with the private operator sharing some degree of risk through a mixture of fixed fees and incentive based compensation that is linked to the contractor's achievement of agreed-upon targets.

For RAD, the primary benefits to be gained from such an arrangement include technical and managerial expertise that could be brought to bear in reducing UFW, gathering system data, reducing costs, and increasing revenues. In addition, it could provide RAD with the expertise required to institute modern cost accounting procedures and up to date accounting software that is badly needed.

Although we did not undertake an analysis of the Šibenik utility, presumably it too would benefit from the same expertise as RAD. In addition, a management contractor would provide a focal point for capital planning throughout the county, thereby enhancing coordination and improving the potential to exploit connectivity between the various utility service areas. Finally, the management contractor would provide the Šibenik utility with a vehicle to strengthen the management skills and enhance the technical and financial performance of its constituent utilities throughout the county.

During our interviews with the Chief Executive of RAD, he expressed an interest in exploring a regional solution further, and is likely to support any arrangement that provides RAD with additional technical and managerial expertise while sharing the cost of such expertise with other service providers.

VIII.2 BOT for Wastewater Treatment in Region

Given the strategic location of Drniš upstream of important coastal tourism centers and nearby a national park, there is an urgent need to address the environmental degradation caused by the disposal of untreated sewage from Drniš into the river Čikola. Croatia's pending application for EU membership makes a solution to this problem increasingly urgent. However, RAD lacks the financial resources to invest in an appropriate wastewater treatment facility.

We recommend that RAD approach the Šibenik utility and other service providers within Šibenik county about a regional solution for wastewater treatment. This would most likely take the form of a BOT for a greenfield wastewater treatment facility. Under such an arrangement, a private operator would finance and construct a wastewater treatment plant and would then operate the plant for a pre-determined duration before transferring ownership to a contracting authority (due to its size, financial resources, and role as a regional hub for water and wastewater services, the Šibenik utility is likely the most appropriate).

The private operator would remunerate itself through collection of a cost-recovering tariff[40] that would be agreed with individual utilities through a contractual mechanism called an "offtake agreement." This type of contract would be required between the private operator and every utility from which the operator accepts wastewater to be treated. It establishes the terms of the relationship, defines effluent and treatment standards, and sets the volumetric price at which the BOT operator will accept untreated wastewater from the

[40] *The tariff must be "cost recovering" in order to provide the operator with sufficient remuneration to cover the cost of operations, maintenance, and depreciation, as well as a reasonable return.*

utilities. Such offtake agreements would be in addition to the actual BOT arrangement between the operator and the primary contracting party to whom ownership of the newly constructed assets will transfer at the conclusion of the contract.

IX. Next Steps

Table 15 presents a brief action plan for RAD. It is a non-exclusive list of suggestions that the utility should undertake. RAD and the municipality already have achieved some of these suggested actions. However, it may be appropriate for RAD to develop or enhance some of its current practices with simple changes, such as including an automatic inflation escalator in its current tariff structure.

Table 15: RAD d.o.o Drnis – Suggested Water and Sewer Enterprise Action Plan

	Action Items	Description
I. Corporate Reorganization	*Define Service Provider Assets*	▸ The water utility should, in conjunction with the local municipality, develop or revise its current service agreement with the municipality, by issuing: ▸ A broad statement of the intended use of the assets; ▸ A complete inventory of the assets and a description and other documentation of their physical condition and depreciable value. ▸ The utility should periodically revalue the transferred assets for purposes of depreciation, disposition and balance sheet adjustments in accordance with applicable law, and corresponding amendments to the property transfer agreement to reflect these revaluations. ▸ Periodic amendments to the inventory of the assets transferred to reflect dispositions and acquisitions. In addition, the question of HV's ownership of assets must be resolved.
	Review and Conclude Service Agreement Between the Utility and City Administration	▸ The local administration and the utility already have a modest service agreement in place, but this service agreement should be reviewed in light of the utility's requirements for additional capital spending for leakage reduction etc. ▸ The service agreement should project tariff and service levels for three to five years, but should be subject to periodic (perhaps annual) review and revision by mutual agreement. The service agreement should include the following major elements: ▸ A statement of the purposes of the agreement; ▸ A general statement of the rights and obligations of the utility, including the rights to set its own operating, management, personnel, and other business policies; to take all reasonable and necessary steps to bill and collect tariffs from customers; to deliver services at a level consistent with revenues, and the obligations to operate as a financially-sustainable enterprise, to take all actions reasonably required to enable it to deliver the agreed level of services, and to resolve all disputes regarding non-compliance with the service agreement in proceedings before the local independent regulatory body; ▸ A general statement of the rights and obligations of the Administration, including the right to monitor compliance with the service agreement, and the obligations to permit the Enterprise to exercise its rights and fulfill its obligations without inappropriate political influence or interference by the Administration, to support a level of tariffs appropriate to the agreed level of service. ▸ Statements of long-term and short-term goals for water and wastewater service levels, including objective measures and specific schedules. Such goals could include improved water supply service duration and pressures, reduced water supply system leakage, improved water and wastewater system maintenance, reduced energy use, and improved water and effluent quality; ▸ A requirement for the utility to prepare and execute a capital repair and capital investment plan, in coordination with the City's overall plan for social and economic development; ▸ A requirement for the utility to develop and undertake (and for the Municipal Administration to support) a program of customer education and improved customer relations; ▸ Requirements for improved accounting by the utility and for period audits and publication of its financial results; ▸ Requirements for periodic reporting by the Administration and by the utility on performance (or non-performance) of their respective obligations under the service agreement; ▸ Statements of any conditions of the Administration's or the Utility's obligations, including availability of funding for required capital repairs and capital investments, absence of material adverse changes in law, and absence of *force majeure*; ▸ A statement that the service levels called for by the agreement will be periodically reviewed and revised by mutual agreement; and ▸ A general statement of intent by the Administration and the Enterprise to cooperate with one another, use their best efforts to fulfill their respective obligations and to allow the other party to exercise its rights under the service agreement.

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Table 15 (cont'd): RAD d.o.o Drnis – Suggested Water and Sewer Enterprise Action Plan

	Action Items	Description
II. Regulatory Issues	*Include Water and Wastewater Regulation in the Existing Energy Regulatory Commission's Responsibilities*	▸ Although the responsibility for tariff regulation currently resides at the municipal level, there has been no attempt to regularize the procedures or criterion for tariff adjustment. The result has been undue political interference in the tariff setting process and a lack of political willingness to increase tariffs to a level that even approaches cost recovery. One possible solution would be to expand the scope of the current, national-level energy regulatory commission to include the regulation of water tariffs, with the following terms and conditions: ▸ All decisions of the regulatory body regarding new tariffs will be made only after a public hearing (preceded by publication of adequate prior written notice of the hearing), at which all interested parties will have the right to be heard and to present relevant evidence; ▸ All decisions of the regulatory body will be in writing, stating the evidence presented and the reasons for its decision; ▸ All decisions of the regulatory body will be published in the local mass media and will be available to all interested parties at no cost (copies to be provided at actual cost); ▸ So long as the regulatory body acts within its jurisdiction, according to the procedures described in the Charter and according to applicable law, the City Administration will not interfere with its operations.
	Establish Automatic Inflation Escalator Mechanism In Tariffs	▸ The tariff approval process should include an indexed inflation escalator mechanism. This mechanism would allow the utility to adjust water and wastewater tariffs on their own, without further approval of the tariff regulator, to reflect inflationary increases in the cost of major inputs, especially energy costs, according to inflation indices issued periodically (e.g., quarterly) by the appropriate government agency.
III. Management Improvements	*Increase Emphasis on Financial Reporting and Accountability*	▸ Monthly reports should include Trial Balance, Monthly Cash Flow, and Profit and Loss statements. All financial statements should have columns comparing forecast versus actual (not adjusted for revenues received). Accounts receivable should be analyzed (bad debt expense) on a monthly basis. The utility should annually undergo an external audit. Further, the utility should begin the process of allocating its costs among its various cost centers.
	Implement an Efficient Cost Accounting System	▸ The Accounting Department has an less than fully effective cost accounting system in place. Installing a consolidated cost accounting computer program will greatly enhance the productivity of numerous operations. In addition, the utility manager will be able to more fully understand the utility's production costs.
	Revalue Assets	▸ The utility should consider reviewing whether it needs to hire a professional valuation expert who would conduct an on-site physical valuation. Based on the results of such an exercise, the utility should include the calculated revalued depreciation in its tariff. Currently, the tariff structure includes a depreciation value that may not accurately reflect the actual value of the utility's assets.

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Table 15 (cont'd): RAD d.o.o Drnis – Suggested Water and Sewer Enterprise Action Plan

	Action Items	Description
IV. Operation al Efficiency Issues	*Reduce Production Inefficiencies*	▸ The utility should compare current actual production with factory-designed nameplate capacity and develop a production efficiency program that will be included in the new service agreement with the Administration.
	Reduce Delivery Losses	▸ The utility should determine the magnitude of delivery losses and develop a loss reduction program that will be included in the new service agreement with the Administration as well as capital improvement planning.
	Streamline the Enterprise Employment	▸ The utility management should evaluate total staff requirements to determine if possible staff redundancies and production inefficiencies exist. Where possible, management should reduce staffing requirements through transfers and attrition.
V. PSP	*Performance-based Management Contract at County Level*	▸ The utility should approach the Šibenik utility about the possibility for a performance-based management contract at the county level. The management contract itself would be concluded between the private operator and the Šibenik utility, however RAD could negotiate an accession agreement whereby it would purchase a particular level of effort from the management contractor for achievement of pre-defined targets.
	Regional BOT for Wastewater Treatment	▸ The utility should initiate a dialogue with other services providers in the county about arranging a BOT for the construction of a greenfield wastewater treatment facility. Due to its small size, RAD should not be the contracting party for the BOT. Rather, a larger utility such as that in Šibenik should sign the BOT, with small utilities such as RAD negotiating individual offtake agreements with the BOT service providers.

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Annex B. Benchmarking Indicators - Definitions

This section provides a brief discussion of water / wastewater indicators and their definition. These are commonly used indicators and definitions and are periodically used in the financial, institutional and engineering review.[41]

Coverage

INDICATOR	UNIT	CONCEPT
Water Coverage	%	Population with easy access to water services (either with direct service connection or within 200m of a standpost)/total population under utility's nominal responsibility, expressed in percentage.
Sewerage Coverage	%	Population with sewerage services (direct service connection)/total population under utility's notional responsibility, expressed in percentage.

Coverage is a key development indicator. Both coverage indicators are impacted by currency of census data. The need to estimate populations served by stand posts will affect the confidence that can be placed in the water coverage measure. Coverage provides insights into the extent of the infrastructure provided but not aspects of quality of service.

Water Consumption and Production

INDICATOR	UNIT	CONCEPT
Water Production	lpcd m^3/conn/m m^3/hh[1]/m	Total annual water supplied to the distribution system (including purchased water, if any) expressed by population served per day; by connection per month and by household per month.
Water Consumption	lpcd m^3/conn/m m^3/hh[1]/m	Total annual water sold expressed by population served per day; by connection per month and by household per month
Metered Water Consumption	lpcd m^3/conn/m m^3/hh[1]/m	Total annual metered water consumed expressed by metered population served per day; by metered connection per month and by metered household per month.

Note 1: household.

[41] *The indicators and definitions are predominately taken from "Russia Water Loan Feasibility Assessment: Overview" Prepared for United States Agency For International Development, Contract No. CCS-0008-C-00-2057-00, Task Order 87. by Alexander Gamota, Michael Schaeffer, Samuel Coxson, Ernie Slingsby et a. In addition, several definitions were obtained from The Benchmarking Startup Kit, World Bank, 2003 obtained from the following website addresses:* http://www.worldbank.org/html/fpd/water/topics/bench_networkutility.html#English and, http://www.worldbank.org/html/fpd/water/topics/bench_network.html.

Theoretically the "best" water consumption indicator is expressed in terms of liters per connection per day (lpcd). However there are data problems, including:

- Lack of accurate total consumption data (for example from universal metering)
- Poor quality, or out of date, census data

While the accuracy of service populations may need improvement, utilities are often more confident in the number of connections in their system, and the number of households they supply. In addition water production figures may be known more reliably than those for water consumption. To draw on these or other sources of (potentially) more reliable data a number of indicators have been included. These will allow trending analyses to be undertaken within a utility. Inter utility comparisons will be more difficult, however, given the different mix of household sizes and dwellings served by one connection. This is especially the case between utilities in different countries. Homogeneity of household size, and dwellings per connection, within a country will allow informed in-country comparisons to be made.

Unaccounted for Water (UFW)

INDICATOR	UNIT	CONCEPT
Unaccounted-for-Water (UFW)	% $m^3/km/d$ $m^3/conn/d$	Difference between water supplied and water sold expressed as a percentage of net water supplied; as volume of water "lost" per km of water distribution network per day; and volume of water "lost" per water connection per day.

Unaccounted for water represents water that has been produced and is "lost" before it reaches the customer (either through leaks, through theft, or through legal but non monitored usage). Part of this unaccounted for water can be saved by appropriate technical and managerial actions. It can then be used to meet currently unsatisfied demand (and hence increase revenues to the utility), or to defer future capital expenditures to provide additional supply (and hence reduce costs to the utility). There is a debate as to the most appropriate measure of unaccounted for water. A percentage approach can make utilities with high levels of consumption, or compact networks, look to be better performing than those with low levels of consumption or extensive networks. To capture these different perspectives the reporting of three measures of unaccounted for water has become the norm.

Metering Practices

INDICATOR	UNIT	CONCEPT
Proportion of connections that are metered	%	Total number of connections with operating meter/ total number of connections, expressed in percentage
Proportion of water sold that is metered	%	Volume of water sold that is metered/ Total volume of water sold, expressed in percentage

Metering of customers is considered good practice. It allows customers the opportunity to influence their water bills, and provides utilities with tools and information to allow them to better manage their systems. The indicators provide two separate perspectives on the issue, both of which are relevant in their own right. Taken together the indicators provide insights into the effectiveness of a metering installation strategy (the ratio proportion of water sold that is metered divided by the proportion of connections that are metered indicates the extent to which a utility is targeting large water users as the highest priority).

Pipe Network Performance

INDICATOR	UNIT	CONCEPT
Pipe Breaks	breaks/km/yr. breaks/conn/yr.	Total number of pipe breaks per year expressed per km of the water distribution network; and per number of water connections
Sewerage Blockages	blockages/km/yr. blockages/conn/yr.	Total number of blockages per year expressed per km of sewers; and per number of sewerage connections.

The number of pipe breaks, relative to the scale of the system, is a measure of the ability of the pipe network to provide a service to customers. The length of the network and the number of connections can normalize the number of breaks. The rate of water pipe breaks can also be seen as a surrogate for the general state of the network, although it reflects operation and maintenance practices too. It must be recognized, however, that highly aggregated reporting can hide the fact that sections of the network may be perpetually failing, whilst much of the remainder is in reasonable condition. Sewer blockages are, likewise, a measure of the ability of the sewer network to provide a service to customers. Blockages can reflect a number of issues

including the effectiveness of routine operations and maintenance activities, the hydraulic performance of the network, and the general condition of the pipes.

Cost and Staffing

INDICATOR	UNIT	CONCEPT
Unit Operational Cost	US$/m³sold US$/m³ produced	Total annual operational expenses[1]/Total annual volume sold. Total annual operational expenses[1]/Total annual water produced.
Staff/'000 Water connection Staff/'000 W&S connection Staff/'000 water pop served Staff/'000 W&S pop served	# # # #	Total number of staff expressed as per thousand water connections; per thousand water and sewerage connections; per '000 water service population and per '000 water and sewerage service populations.
Labor Costs as a proportion of Operational Costs	%	Total annual labor costs (including benefits) expressed as a percentage of total annual operational costs.
Contracted-out service costs as a proportion of operational costs	%	Total cost of services contracted-out to the private sector expressed as a percentage of total annual operational[1] costs.

Unit operational costs provide a "bottom line" assessment of the mix of resources used to achieve the outputs required. The preferred denominator related to operational costs is the amount of water sold. This ratio then reflects the cost of providing water at the customer take off point.

Lack of universal metering, doubtful accuracy of many household meters, and a focus in the past on water production, mean that an alternative measure of operational cost per cubic meter of water produced is also relevant in the short term. Staff costs are traditionally a major component of operating costs. Understanding staffing levels can often give a quick guide to the extent of overstaffing in a water utility. While preferable to allocate staff to either water or sewer services, this information is often not available. The staff ratios therefore use both the number of water connections, and the total number of water and sewer connections as denominators.

Comparisons are best made between utilities that offer the same scope of service both in terms of total size, and mix of water and sewer service. Note that with increasing use of outside contractors the emphasis on staff numbers will become less relevant. The number of people served per connection varies from country to country depending on the housing stock and different approaches to service connections. To facilitate international comparisons a denominator of populations served has also been included. Utilities are

frequently over staffed and this measure provides insights into the impact of possible changes in future staff numbers.

Quality of Service

INDICATOR	UNIT	CONCEPT
Continuity of Service	Hrs/day	Average hours of service per day for water supply.
Complaints about W&S services	% W&S connection	Total number of W&S complaints per year expressed as a percentage of the total number of W&S connections
Wastewater treatment	%	Proportion of collected sewage that is treated by at least primary treatment (including screening).

Historically there has been limited attention paid to measures that capture the quality of service provided to customers. This, in fact, should be a particular focus of performance measurement, especially with the emphasis currently being placed on the use of output measures to monitor service provision. The measures presented above are a limited first step in the process of capturing information on quality of service. Complaints, while relatively easy to track, give only a glimpse of actual company performance - consumers may have become accustomed to poor service and do not complain. In other instances there are poor, or non-existent, mechanisms in place to report complaints. Capturing at least some customer-derived data, however, is considered an important starting point.

Collection of wastewater does not mean that the waste is fully treated before discharge back to the environment. This indicator will provide an understanding of the amount of effluent that is discharged without any material treatment by the utility. A more comprehensive set of quality of service indicators could be developed but the likelihood of the data being collected by utility managers is limited in the short term. Expansion of the set is therefore a medium to long-term objective.

Billings and Collections

INDICATOR	UNIT	CONCEPT
Average Tariff Water and Sewerage	US$/m³/yr. US$/connection/yr. US$/hh/yr.	Total annual operating revenues (W&S) expressed by annual amount of water sold; by number of connections and by households served.
Total Revenues per population served/GDP	%	Total annual operating revenues per population served/National GDP per capita; expressed in

INDICATOR	UNIT	CONCEPT
		percentage
Residential fixed charge	US$/connection/yr. %	Any fixed component of the residential tariff (total amount) and as a proportion of the average tariff per connection per year.
Ratio of industrial to residential charges	%	The average charge (per m³) to industrial customers compared against the average charge (per m³) to residential customers.
Connection charge	US$ and % GDP - water US$ and % GDP-sewage	The cost to make a residential pipe connection to the water system and the sewer system measured in absolute amount and as a proportion of national GDP per capita.
Collection Period	Months	Year-end accounts receivable/Total annual operating revenues expressed in months equivalent of sales.

What people pay for water and sewer services is important. As in other indicators, unreliable consumption information necessitates the use of multiple measures for average tariff (i.e. per cubic meter, per connection, and per household). High tariffs may reflect the degree to which sewer services are provided. The average tariff used in this indicator does not explicitly account for different services provided and any inter utility comparisons should take this into account.

Average tariffs need to be put in the perspective of affordability. Income data, however, is not easy to obtain. The indicator selected here, therefore, compares average per capita tariffs as a proportion of per capita GDP. GDP will be for a whole country, and not reflect local variations, but is considered adequate for the broad comparisons to be made at the current time. Inter country comparisons will be hindered by the variable relationship that exists between GDP and income, but the trend for this ratio within a country will provide insights into changes in the relative cost of water.

Some utilities use fixed charge components within the residential tariff (i.e. irrespective of the amount of water consumed). Such tariffs can adversely affect low volume water consumers. They also protect the revenue stream to the utility in periods when consumption is highly variable. Comparison of the fixed component with the average tariff will give an indication of the relative weight of the fixed and variable component of a water bill.

There may be a cross subsidy between industrial consumers and residential consumers. The ratio of the average charges (per m³) to industrial and residential customers provides some quantification of this subsidy. Subsidies are complex and this ratio provides only a simplistic assessment of the situation in any utility.

Paying for the service is an on going expense. For many, the cost of connecting to the pipe network can be a significant financial hurdle. Comparing connection charges will provide insights onto the level to which this hurdle has been raised. It is a particular issue when seeking to connect poorer sections of the community. The indicator provides the absolute level and as a proportion of national GDP per capita.

Billing customers, and getting paid are two different things. The effectiveness of the collections process is measured by the amount of outstanding revenues at year-end compared to the total billed revenue for the year. This is expressed in month equivalents.

Financial Performance

INDICATOR	UNIT	CONCEPT
Working Ratio	#	Total annual operational expenses/Total annual operating revenues
Debt Service Ratio	% Operating Revenues	Total annual debt service expressed as a percentage of total annual operating revenues.

These indicators have been selected from a much larger range of financial indicators (which include other leverage, liquidity, profitability and efficiency ratios). They help answer two important questions:

- Do revenues exceed operating costs? And,
- What is the fixed hurdle of debt repayment as a proportion of utility revenue?

Capital Investment

INDICATOR	UNIT	CONCEPT
▸ Investments	▸ % Operating Revenues ▸ US$/c.	▸ Total annual investments expressed as a percentage of total annual operating revenues; and per (water) capita served.
▸ Net Fixed Assets/capita	▸ US$/c	▸ Total annual net fixed assets per (water) capita served.

Investment will fluctuate from year to year and the indicators selected will reflect this variation. An inter utility comparison in any one year will likely have a great range of values. Over time, however, rolling average indicators can be calculated that will allow an impression of the steady state level of investment to be observed. The capital intensity of the utility is captured by the net fixed assets- per-capita served indicator. Unfortunately there is often limited information available about asset values and until more emphasis is placed on this item the values derived must be treated with caution.

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